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John O. Sargent

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THE

COMPLETE FARMER

AND

RURAL ECONOMIST;

CONTAINING

A COMPENDIOUS EPITOME OF THE MOST IMPORTANT BRANCHES
OF AGRICULTURAL AND RURAL ECONOMY.

BY THOMAS G. FESSENDEN.
EDITOR OF "THE NEW ENGLAND FARMER."

Agriculture is the art of arts: without it, man must be a savage, and the world a wilderness.

TENTH EDITION.

REVISED, IMPROVED, AND ENLARGED.

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PREFACE.

In the following pages, the object of the writer is to give brief, but it is hoped perspicuous and practical sketches of some important improvements in modern husbandry. In attempting to carry this design into effect, it has been his intention to insert no matter which is merely conjectural or speculative; to give place to nothing not worth the attention of the person whose livelihood depends on his pursuits as a cultivator and who has neither time nor money to devote to such books as are expensive, voluminous, and foreign or remotely related to available improvements in husbandry.

With this view, the author has collected and generally abridged, from the sources which his occupation as editor of the New England Farmer has made it his duty as well as his pleasure to explore, the materials of the little work now submitted. He does not pretend to have taken a wide survey of the field of husbandry, much less, in this tract, to have given a plan of the whole premises. But he hopes his observations, though limited, may prove serviceable so far as they extend. Agriculture is the most extensive as well as the most useful of the sciences; and as an art may be compared to the ocean, in which every stream of improvement in the moral and physical condition of mankind pours its contribution. Still, it is not necessary to circumnavigate the whole of this world of waters in order to make voyages of valuable discovery. We cannot dip an oar nor launch a skiff in or upon the bosom of this great deep, without finding something to reward our adventures.

Agriculture, although the most ancient of the arts, not only coeval with, but in truth the sun from which emanated the dawn of civilization, is, nevertheless, the art in which the beneficial effects of modern improvement are most strikingly exemplified. Let us contrast its former with its present condition in Great Britain.

According to English laws in force from the fifth to the eleventh century, "all the cattle of a village, though belonging to different owners were pastured together in one herd, under the direction of one person (with proper assistants,) whose oath in all disputes about the cattle was decisive. Their ploughs seem to have been very slight and inartificial; for it was enacted, that no man should undertake to guide a plough who could not make one; and that the driver should make the ropes with which it was drawn of twisted willows. But slight as these ploughs were, it was usual for six or eight persons to form themselves into a society for fitting out one of them, and providing it with oxen, and every thing necessary for ploughing; and many minute and curious laws were made for the regulation of such societies. This is a sufficient proof both of the poverty of the husbandman and the imperfect state of agriculture among the ancient Britons of this period."*

"By the laws of Ina, king of the West Saxons, who flourished in the end of the seventh and beginning of the eighth century, a farm consisting of ten hides or ploughlands was to pay the following rent, viz.: ten casks of honey, three hundred loaves of bread, twelve casks of strong ale, two oxen, ten wethers, ten geese, twenty hens, ten cheeses, one cask of butter, five salmon, twenty pounds of forage, and one hundred eels."† Such has been the state of tillage in that country which is now eulogized as the garden of Europe!

Improvements in breeds of domestic animals by judicious crosses, and propagating from the best specimens of their species, as well as plentiful and suitable feeding, have advanced the state of agriculture more than the most sanguine advocate for scientific husbandry could have anticipated. To say nothing of the wonders effected by Bakewell and other eminent improvers in that department of husbandry, we will glance at the comparative states of the London cattle market at a distant and a less remote period. An English writer states, that "about the year 1700, the average weight of oxen killed for the London market was three hundred and seventy pounds; of calves, fifty pounds; of sheep, twenty-eight pounds; and of lambs, eighteen pounds. The average weight at present (about the close of the century) is, of oxen, eight hundred pounds; calves, one hundred and forty pounds; sheep, eighty pounds; and lambs, fifty pounds." It would be a curious item in our agricultural knowledge, if information, similar to what we have quoted, relative to Boston and other American markets were correctly ascertained, faithfully recorded, and from time to time laid before the public. We should advance with more celerity and alacrity along the highway of improvement, if we had means of marking and giving comparative views of the progress which we have made and are making.

Some idea of the present state of agriculture in England may be gathered from the following extract from the journal of a traveller· "Every spot of ground capable of being cultivated is improved. Wherever I have been, the fields are generally small, inclosed by hedges, and made perfectly smooth by means of cast iron rollers. Numerous trees are left to grow around the hedges, and scattered over the fields. These are so nicely trimmed as to add greatly to the beauty of the country. Not a weed is suffered to grow. The crops all look well, and are much more productive than ours. The cattle and sheep feed on grass up to their knees, and look, as we should say, fit to kill. The slight inclosures that keep them in their pastures would be but a poor protection against our lean, half-fed, unruly animals. Here the cattle have no need to break fences. They have food sufficient within their own domains. I came here under the impression that this country was bare of trees. On the contrary, I find it better stocked in this respect than the thick settlements of our own country. We wantonly destroy trees as if they were of no value: here they are planted and nursed with as much care as if they bore choice fruit."

Although we think the writer last quoted has somewhat exaggerated the defects of American husbandry, we must allow, that his strictures are not so destitute of some foundation in reality as could be wished.

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* Loudon's Encyc. Agr. p 38.

† Wilkin's Leges Saxon., p. 25.

We, however, have of late improved and are improving in every branch of culture, and bid fair soon to possess a system of agriculture as well adapted to our climate and circumstances, as Great Britain, or even Flanders, can boast of at present. Our fields may have a less imposing appearance, and our products may be less in proportion to the quantity of land we have under cultivation, and still our tillage be on the whole judicious. The agricultural implements and farming operations of the United States are in most particulars very similar to those of Great Britain. Circumstances and climate, however, require variations, which the sagacity of the American cultivator will lead him to adopt, often in contradiction to the opinions of those who understand the science better than the practice of husbandry. In Europe land is *dear* and labor *cheap*; but in the United States the reverse is the case. The European cultivator is led by a regard to his own interest to endeavour to make the most of his *land*; the American has the same inducement to make the most of his *labor*. Perhaps, however, this principle, in this country, is generally carried to an unprofitable extreme, and our farmers would derive more benefit from their labor, as well as their land, if they selected such parts of their possessions as they can afford to till thoroughly, and to manure abundantly. A man may possess a large estate in lands, without being called on by good husbandry to hack and scratch over the whole as evidence of his title. He may cultivate well those parts which are naturally most fertile, and suffer the rest to remain woodland, or, having cleared a part, lay it down to permanent pasture; which will yield him an annual profit, without requiring much labor.

The climate and soil of the United States are well adapted to the cultivation of Indian corn, a very valuable vegetable, which cannot be grown to advantage in Great Britain. This entirely and very advantageously supersedes the field culture of the horse bean (*vicia faba*), one of the most common fallow crops in that island. *Root-husbandry*, or the raising of roots for the purpose of feeding cattle, is, however, of less importance in the United States than in Great Britain. The winters are so severe, that turnips can rarely be eaten by stock on the ground where they grow, and all sorts of roots are with more difficulty preserved and dealt out to stock in this country than in those which possess a more mild and equable climate. Hay is more easily made in the United States than in Great Britain, owing to the season for hay-making being more dry, and the sun more powerful in the former than in the latter country. There are many other circumstances which favor the American farmer, and render his situation more eligible than that of those who pursue the same occupation in most parts of Europe. He is generally the owner, as well as the occupier, of the soil which he cultivates; is not burdened with tithes; his taxes are light; and the product of his labors will command more of the necessaries, comforts, and innocent luxuries of life, than similar efforts would procure in any other part of the globe.

Not only have the inducements to agricultural improvements in the United States been powerful, but of late a corresponding effect has been the result. We cannot better make this evident, than by a quotation from "*Remarks of the Rev.* M. ALLEN, *of Pembroke, County of Plymouth, State of Massachusetts, in the Legislature of that State, on a proposition to renew an Act for the Encouragement of Agriculture and Manufactures,*" published in the New England Farmer, Vol. XII. p. 298.

"It has already been suggested, that the soil of the county from which I came is not the most favorable for agricultural pursuits. The expense of cultivation there is thought by some to exceed the amount to be de rived from it. This was the prevalent opinion before the introduction of modern improvements. The operations of an Agricultural Society have proved, that labor and skill can make even despised soils productive. I suppose that ten bushels of rye to the acre, twenty of Indian corn, one ton of English hay, and two hundred bushels of potatoes, were formerly considered as average crops. Since premiums have been offered, we have claims for from forty to fifty bushels of rye, from one hundred and fifteen to one hundred and twenty-two of Indian corn, from three to four tons of English hay, and from four to five hundred bushels of potatoes. Our improvements have not been confined to single acres; in several instances the products of entire farms have been more than quadrupled."

The advances of agriculture of late years have not been uniform, but accelerated; its progress has been in what mathematicians would call a geometrical ratio. Every step has furnished means for quickening the pace and extending the reach of the next step, and every path has led to a longer and wider avenue of improvement. The time may come, in which science may impress into the service of the cultivator every element or substance which constitutes the globe we inhabit, — the world of matter become completely subservient to the world of mind. Then and not till then will agriculture have attained the utmost degree of perfection of which it is capable.

T. G. Fessenden.

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THE COMPLETE FARMER.

SOILS. A farmer should be well informed of the nature of soils, and of the various plants adapted to them. Some useful plants flourish best in what is called poor land ; and, if cultivators were perfectly acquainted with the art of adapting plants to soils, much manure might be saved, which is wasted by injudicious and improper application.

It is supposed by geologists that the whole of this earth originally consisted of rocks, of various sorts or combinations. These rocks, by the lapse of ages and exposure to air and water, became disintegrated or worn in part or altogether to fine particles, which compose what are called earths or soils. These soils are chiefly silica [sand or earth of flints], lime [or calcareous earth], alumina [clay], and magnesia [a mineral substance]. With these are blended animal and vegetable matters in a decomposed or decomposing state, and saline, acid, or alkaline combinations.

Plants are the most certain indicators of the nature of a soil ; for, while no practical cultivator would buy or undertake to till land, of which he knew only the results of chemical analysis, yet every farmer and gardener, who knew the timber and plants a soil spontaneously produced, would at once be able to decide on its value for cultivation.

It was a maxim of Kliyogg, a famous philosophical farmer of Switzerland, "that every species of earth may be instrumental to the improvement of another of opposite qualities." All sands are hot and dry, — all clays, cold and wet ; and, therefore, the manuring sandy lands with clay, or clay lands with sand, is best for grain and pulse. But it is not the natural soil only that the farmer ought to consider, but the depth of it, and what lies immediately underneath it. For if the richest soil is only seven or eight inches deep, and lies on a cold, wet clay or stone, it will not be so fruitful as leaner soils, that lie on a better under stratum. Gravel is, perhaps, the best under stratum to make the land prolific.

The best loams and natural earths are of a bright brown, or hazel color. Hence, they are called hazel loams. They cut smooth and tolerably easy, without clinging to the spade or ploughshare ; are light, friable, and fall into small clods without chapping or cracking in dry weather, or turning into mortar when wet. Dark gray and russet moulds are accounted the next best. The worst of all, are the light and dark ash colored. The goodness of land may also be very well judged of by the smell and the touch. The best emits a fresh, pleasant scent on being dug or ploughed up, especially after rain ; and, being a just proportion of sand and clay intimately blended, will not stick much to the fingers on handling. But all soils, however good, may be impoverished, and even worn out, by successive crops without rest, especially if the ploughings are not very frequently repeated before the seed is sown.

If we examine tracts of land which have not been cultivated, we find nature has adapted different kinds of plants to most of the distinguishable varieties of soils ; and though some belonging to one may for some cause or other be found on lands of a different quality, they seldom thrive, or perfect their seeds so as to become general. The great care of the farmer ought, therefore, to be, by proper mixtures, to reduce his land to that state and temperament, in which the extremes of hot and cold, wet and dry, are best corrected by each other ; to give them every possible advantage flowing from the benign influences of sun and air ; and to adopt such kinds of plants as they afford in this state the greatest nourishment to ; and to renew their fertility by a judicious allowance of the most proper manures. Where these things are done, there are few spots so unfriendly to cultivation as not to repay his expenses and labor with a plentiful increase. But without these, the best tracts of land will in time become a barren waste, or produce little but woods.

The color of soils is important. " The Farmer's Journal " observes, coal ashes were sprinkled over half the surface of beds, sown with peas, beans, &c., and on these the plants invariably appeared above ground two or three days earlier, obviously on account of the increased warmth; it being a well-known fact, that dark-colored bodies absorb caloric more readily, and in larger proportions than those of a lighter hue.

Soils which absorb the most moisture are the most fertile Sir Humphrey Davy observed, "I have compared the absorbent powers of many soils with respect to atmospheric moisture, and I have always found it greatest in the most fertile soils; so that it affords one method of judging of the productiveness of land."

The methods of improving soils are too numerous to be here fully specified. We will, however, quote one mode of restoring worn-out fields to the fertility of new lands, or lands lately cleared from their aboriginal growth of timber, quoted from a "*Dissertation on the Mixture of Soils*," for which the author, the Rev. MORREL ALLEN, of Pembroke, Massachusetts, was awarded a premium by the Plymouth County Agricultural Society.

"Particles in a soil, which had long been in contact, and, in consequence of long connexion, lost much of the energy of their action on plants, are separated in mixing soils, placed in new connexions, and act with renewed vigor. But the most permanent and best effects are always expected from the mixture of soils of different qualities. When the object is to produce as much immediate influence as possible, merely to assist one short rotation of crops, to have the application we make act chiefly as manure, then we may take our materials from any situation where we know vegetable substances have fallen and decayed.

"We may go into forests, and in certain stages of the growth of the wood, without any perceptible injury, skim the surface of the whole lot. This soil of the woods, carried in sufficiently large quantities on to old fields, will restore them to original productiveness. And this will sometimes prove an inexhaustible resource for renewing old fields; for as often as the fields decline, the soil in the wood lot will be again renewed and fit to remove. For the same purposes the earth should be carried from the sides of walls and fences, where the leaves have been lodged from the forests. It should also be carried from hollows and temporary ponds, which in certain seasons of the year become dry, and afford immense quantities of vegetable matter in different stages of decomposition, and suitable to apply to any kind of soil.

"Where streams of water occasionally overflow the banks, an abundance of vegetable and earthy matter is lodged on the meadows, which in many cases, especially where there is not much extent of meadow to receive the substances conveyed by the stream, it is prudent to remove on to higher land. It will there act as manure, and at the same time gradually alter the texture of the soil, rendering it more retentive of dew and rain, and easily penetrated by the fibrous roots of plants. Of the value of those substances which are carried in streams of water to enrich soils, we have the most convincing proof in the unexampled productiveness of interval lands. It is not exclusively the vegetable substances carried on to these lands which make them so astonishingly productive ; there is a portion of every kind of soil existing in the surrounding country annually carried on with the vegetable substances. Intervals are composed of every sort of earth the water can reach and remove. This circumstance may properly encourage the mixtures of many kinds of earth, even when there is no particular evidence that each kind is especially adapted to remedy any deficiency in the soil which we would improve. There is less hazard in administering medicines in great profusion to cure diseases in the soil, than in the human body. In stepping out of the beaten path of habitual practice, and calling attention to experiments, which to some may look very simple, and to others very absurd, we may become instrumental in the discovery of highly important truths."

It will not do, however, to spread pond mud directly on grass land or on arable ground. An experienced farmer informs us, that he once injured a piece of grass land by spreading pond mud upon it without preparation. It should be mixed with lime and warmer manure, and exposed to the atmosphere, or put into the barn-yard to be trodden upon by cattle.

Arthur Young lays it down as a maxim, that a strong, harsh, tenacious clay, though it will yield great crops of wheat, is yet managed at so heavy expense, that it is usually let for more than it is worth. Much money is not made on such land. The very contrary soil, a light, poor, dry sand, is very often, indeed, in the occupation of men who have made fortunes. Some permanent manure is usually below the surface, which anwsers well to carry on ; and sheep, the common stock of such soils, is the most profitable sort he can depend on

GRASSES. The limits of our plan will oblige us in this, as in many other articles, to omit, or give but brief sketches of, subjects which might be profitably attended to in more minute detail.

Grass is a general name for plants used in feeding cattle, in a green or dry state, for hay or for pasture.

It would require a large volume to describe all the kinds of grass which are or may be cultivated in the United States. Sir John Sinclair observed, ("Code of Agriculture," p. 219,) that there are in all two hundred and fifteen grasses, properly so called, which are cultivated in Great Britain. The Duke of Bedford caused a series of experiments to be instituted by George Sinclair, to try the comparative merits and value of a number of these grasses, to the amount of ninety-seven, the result of which is annexed to Sir Humphrey Davy's "Agricultural Chemistry." According to these experiments, tall fescue grass (*festuca elatior*) stands highest as to the quantity of nutritive matter afforded by the whole crop, when cut at the time of flowering; and meadow cat's-tail grass, *phleum pratense*, called in New England *herd's grass*, and timothy grass in the Southern States, affords most food when cut at the time the seed is ripe.

The following remarks are from an able and elaborate article on the grasses, written by Judge Buel, and published in "The American Farmer":

"I have found in our publications on agriculture very little information on the improvement of our meadow and pasture grounds. Indeed, the names of our native grasses are scarcely enumerated, much less are their habits described, or their relative merits for hay and pasture pointed out, in any American work which has fallen within my notice. A considerable portion of our lands are unsuitable for the system of convertible husbandry, that is, an alternation of grain and grass crops. Of this description are our stiff clays, marshes, and swamps, and all those lands in which tillage is rendered difficult by reason of hard pan, stones, or wetness. These should be improved as permanent meadows and pastures; and it is of the first importance to the farmer to know the grasses which will render them most conducive to profit; for that our grass grounds are as susceptible of improvement as our tillage grounds, by a suitable selection of seeds and suitable management, must be apparent to every reflecting mind. The improvement and productiveness of our cattle and sheep husbandry, which at this time deservedly engage much of the public attention, depend materially on this branch of farming."

After adverting to the sources from which the writer derived most of his information, he proceeds:

"*Sweet-scented Vernal Grass.* This is a grass of diminutive growth, and is not worth cultivating for hay. It is nevertheless considered as valuable in pasture on account of its affording very early feed, and growing quick after being cropped. We are advised by Muhlenburg that it delights in moist soils; by the Bath papers, that it does well in clayey loams; and by Dickson, that it grows in almost any soil, including bogs and sands. G. Sinclair says, it is eaten by oxen, horses, and sheep, though not so freely as some other grasses are.*

"*Meadow Fox Tail* possesses all the advantages of early growth with the preceding, and is much more abundant in product and nutriment. It generally constitutes one of five or six kinds which are sowed together by the English farmers for pasture; and affords withal a tolerable crop of hay. It does best in moist soils, whether loams, clays, or reclaimed bogs. Sheep and horses have a better relish for it, says G. Sinclair, than oxen.

"*Rough Cock's Foot.* Dr. Muhlenburg and T. Cooper concur in opinion that this is the *orchard grass* of the United States. In England, cock's foot is taking the place of rye grass with clovers. Arthur Young speaks in high commendation of it; though all writers concur in the opinion, that it should be frequently and closely cropped, either with the scythe or cattle, to reap the full benefit of its great merits. I should prefer it to almost every other grass; and cows are very fond of it. Cooper rates it above timothy, and says it is gradually taking the place of the latter among the best farmers about Philadelphia. This is probably owing to the fact that it is earlier than timothy, and of course more suitable to cut with clover for hay. Its growth is early and rapid, after it has been cropped. It does well on loams and sands, and grows well in shade.

"Colonel Powel, a gentleman who combines as much science with judicious practice, especially in cattle and grass husbandry, as any person in the Union, says, 'I have tried orchard grass for ten years. It produces more pasturage than any artificial grass I have seen in America.' Sow two bushels of seed to an acre.

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* Judge Buel does not seem to have been personally acquainted with this invaluable grass. Its proper situation is *high*, well-drained meadows. It constitutes, in such meadows, in Massachusetts, at least one half of the whole crop. Its chief fault is, that it is too early for the other grasses, but it affords a second and even third crop if cut early. It is the grass which gives the finest flavor so grateful to milch cows.

"*Tall Oat Grass.* Both Arator (Mr. Taylor) and Dr Muhlenburg have placed this at the head of their lists of grasses, which they have recommended to the attention of the American farmer. The latter says, it is of all others the earliest and best grass for green fodder and hay. The doctor was, probably, not apprized of its deficiency in nutritive matter, as indicated in the table. It possesses the advantage of early, quick, and late growth, for which the cock's foot is esteemed, tillers well, and is admirably calculated for pasture grass I measured some on the 20th of June, when in blossom, when it should be cut for hay, and found it four and a half feet long. The latter math is nearly equal in weight, and superior in nutritious matter to the seed crop.

"*Tall Fescue,* although a native grass, has not fallen under my personal observation. It stands highest, says Davy, according to the experiments of the Duke of Bedford, of any grass, properly so called, as to the quantity of nutritive matter afforded by the whole crop, when cut at the time of flowering; and meadow cat's-tail (timothy) grass affords most food, when cut at the time the seed is ripe. It grows naturally in wet grounds, in bog meadows, and on the sides of ditches, often to the height of four or five feet. Our ignorance of agricultural botany, and of the intrinsic value of this grass, can alone have prevented its being more generally known and cultivated. It must be very valuable for wet grounds, as, from its rapid growth, it is calculated to smother or keep down the coarser kinds, which naturally abound in these situations.

"*Rye Grass* is extensively cultivated in Scotland and the north of England, and, where cock's foot has not superseded it, is generally mixed with clover seeds. It is rather declining in public estimation. It does well in pasture; and as it contains much nutriment, is considered valuable for cows and sheep. Dickson says, it does best in rich, moist meadows. Young does not speak well of it.

"*Red Clover.* There are many species of the *trifolium,* and several varieties of the red clover. Whether the kind we generally cultivate is the *pratense,* or not, I am unable to determine. The character of red clover as an ameliorating fertilizing crop, is too generally known to require illustration. It cannot be depended upon for permanent grass lands ; though it yields to no grass for alternating with grain in convertible husbandry. It formerly was as indispensable in a course of crops in Norfolk, England, (which has been considered preëminent for good tillage,) as turnips ; and the maxim was, and still is, 'no turnips, no crops.' But it appears from Young's survey of that country, that it cannot now be depended on oftener than once in from eight to twelve years. Trefoil, white clover, cock's foot, rye grass, &c., are therefore alternated with red clover in the grass years. There is reason to believe, that neither red clover nor other grasses, will bear repeating for a course of years, upon the generality of soils. They exhaust the ground of the peculiar nourishment required for their support. In Great Britain white clover, trefoil, rye grass or cock's foot, are generally sown with red clover seeds. From twenty to thirty pounds of seeds are sown to the acre. In the northern states, timothy is generally sown with clover; though the mixture is an improper one for hay; for the clover is fit for the scythe ten or fifteen days before the timothy has arrived to maturity. If sown alone, from eight to sixteen pounds of clover seed should be put on an acre ; more on old land than on new.

"*White* or *Dutch Clover* (*trifolium repens*), is considered in England of importance to husbandry, if we are to judge from the great quantity of seed which is there sown annually. With us, many districts produce it spontaneously ; but it is too seldom sown. It shrinks greatly in drying, and does not contain as much nutritive matter as red clover ; yet its value as a pasture grass is universally admitted. Its increase is very much facilitated by a top dressing of gypsum lime or ashes.

"*Lucerne*, although affording much more green food, contains less nutriment in a single crop than red clover. It must, however, be borne in mind, that it grows much quicker than clover, and will bear cutting twice as often. In the soiling system, an acre of lucerne will keep four cattle or horses from the 15th of May to the 1st of October. I cut a piece about the 15th of May, and again about the 20th of June, to feed green, and then ploughed the ground, and cropped it with ruta baga, which yielded sixteen tons to the acre of roots, as fine as I ever saw. Mr. Fowell (see

Young's 'Norfolk,' p. 345) derived a clear profit of *thirteen pounds seventeen shillings and four-pence per acre* from his lucerne, fed green to working horses. This is almost equal to sixty dollars the acre. An idea has prevailed, that it will not thrive in this latitude, (42–3,) but the experiments of the late Chancellor Livingston, and of Le Roy de Chaumont, prove otherwise. I sowed seed in 1821, at the rate of six pounds the acre, with barley. It has stood the winters well, much better than clover ; and has been in a state of progressive improvement. Drought has not affected it. The plants are very tender the first year ; and require either a very clean tilth, or to be kept free from weeds and grass with a hoe the first year. It should have a deep loam, as it sends down tap roots five or six feet ; and it is equally necessary that the ground should not be wet. It may be sown either in drills or broad-cast, with or without grain. Fifteen pounds of seed are required for the acre if drilled, and twenty is not too much if sown broad-cast. To the proprietor of a dairy, an acre or two of lucerne would be valuable, to be fed to his cows in addition to ordinary pasture.*

"*Long-rooted Clover* is a native of Hungary, and I do not think has ever found its way across the Atlantic. The root is biennial, and if sown in the fall, lasts only during the next season. It penetrates to a great depth in the ground, and consequently is but little affected by drought. It therefore requires a deep dry soil. The product of this grass, when compared to others that are allied to it in habit and place of growth, proves greatly superior. It affords twice the weight of grass, and more than double the nutritive matter that is given by the common clover. It gives abundance of seed · and, says G. Sinclair, if the ground be kept free of weeds, it sows itself, vegetates, and grows rapidly, without covering in, or any operation whatever. Four years it has propagated itself in this manner on the space of ground which it now occupies, and from which this statement of its comparative value is made. This species would, no doubt, prove a valuable acquisition to our husbandry, whether we consider its value for green food, hay, or as a green crop to be turned in preparatory to grain.

"*Sain Foin* is peculiarly adapted to a calcareous or chalky soil. It is true it is cultivated in Norfolk, England, which is a soil of sand and loam, naturally destitute of calcareous matter. But it is common there to dress their lands with clay marl, which abounds with carbonate of lime; without which dressing, says Young, Norfolk soils will not grow sain foin. This writer considers it 'one of the most valuable plants that were ever introduced into the agriculture of Great Britain.' The well-known Mr. Coke cultivates four hundred acres of this grass, and sows it without other seeds. Several attempts have been made to cultivate sain foin in this country, but hitherto I believe without success.*

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* For further remarks on the culture of lucerne, see "The New England Farmer," Vol. IX. p. 342.

"*Timothy*. This grass is distinguished in Great Britain by the name of *meadow cat's-tail*; in New England by that of *herd's grass*. It is one of the most valuable grasses that are cultivated; and, what is worthy the notice of every farmer, it affords *more than double* the nutriment when cut in the seed to what it does in the flower. In tenacious, strong, and moist soils, it is entitled to a precedence, perhaps, to any single grass for hay, yet does not seem to be suitable to mix with clover seeds when intended for meadow. Another consideration, which renders it particularly worthy of attention, is the seed which it affords, and which may be saved without materially diminishing the hay crop. From ten to thirty bushels of seed may be taken from an acre of timothy, which, at the price it now bears, is of itself a handsome remuneration.

"*Fiorin* has of late years been brought into notice in Great Britain, by the experiments of Dr. Richardson; who particularly recommended it for the cold boggy soils of the mountainous districts, where ordinary grasses would not thrive. The peculiar value of the fiorin, and of other grasses of the agrostis family, arises from their fitness for *winter pasture*: as they lose very little of their bulk or nutriment by remaining in the soil after they have ceased to grow. Its name (*creeping bent* or *couch grass*) implies a difficulty in mowing it, except on a surface perfectly smooth.

"*Upright Bent Grass*. Dr. Muhlenburg considers this the *herd's grass* of the southern, and the *foul meadow* of the eastern States, of which *white top* and *red top* are varieties.

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* Sain foin may be considered as out of the question in New England. So large a portion is winter-killed that it is not worth cultivation. This is affirmed on the strength of repeated trials.

This grass is more congenial to our climate than to that of England. In any boggy soils, both varieties of this grass have come in spontaneously, as soon as the ground has been cleared and drained, have soon formed a compact sod, and afforded good hay and good pasture.

"*Flat-stalked Meadow Grass.* This, according to Muhlenburg, is the *blue grass*, which is considered as a pest in many of our tillage grounds. The small crop which it gives, and the little nutritive matter which this affords, shows the little dependence which ought to be placed on it for grazing, or for hay.

"*Smooth-stalked Meadow Grass* is a native plant, and is well adapted for permanent pastures. It grows quick after being cropped, and does well upon dry ground.

"*Floating Fescue* grows well in swamps and bog soils, where good kinds are most wanted.

"I would suggest, with much deference, whether grasses may not be divided, for the *practical* benefit of the farmer, into three kinds, to wit: 1. *Cultivated Grasses.* All kinds, strictly speaking, which the soil does not produce spontaneously, are cultivated grasses. But the term as generally used, and in the sense I here employ it, applies only to such as are sown to *alternate with grain, pulse, and roots, in a systematic rotation of crops.* The grasses selected for this purpose are, generally, the red clovers, lucerne, sain foin, orchard, tall oat, timothy, or rye grass. Clover is the primary dependence on all soils which will grow it, and especially where gypsum can exercise its magic powers. As vegetables are said to exhaust the soil in proportion to the smallness of their leaves, (the larger the leaves the more nutriment they draw from the atmosphere, and the less from the soil,) clovers are entitled to the high commendation they have obtained among American farmers. But as these plants are liable to premature destruction by the frosts of winter, it is both prudent and wise to intermix with their seeds those of some other grasses more to be depended on.

"For this purpose, on sands, loams, and gravels, and these constitute the soils usually employed in convertible husbandry, the orchard grass or tall meadow oat grass appear to be best calculated to insure profit. They grow early, delight in a clover sod, and are fit for the scythe when clover is in the bloom, the time it ought to be cut. The hay from this mixture may be made before harvest commences; and if the soil is good, a second crop may be cut almost equal to the first. If intended for pasture the second year, either of these grasses will afford more abundant food than timothy.

"*In clays*, the meadow fox tail, an excellent grass, might be substituted, though, according to Sinclair, the tall oat grass will do well here also. *In wet soils*, where clovers do not grow well, timothy and meadow reed grass would be a good selection, sown either separate or together.

"Lucerne and sain foin require a deep dry soil, and are generally sown without other seeds. The first does not attain to perfection before the third year; and both, where successfully cultivated, are permitted to occupy the ground from six to eight years.

"2. *Meadow Grasses.* In selecting these the object is to obtain the greatest burden of good hay, and to mix those kinds which may be profitably cut at the same time.

"*For clayey and moist soils*, many valuable and nutritious kinds seem to be well adapted; that is to say, meadow fox tail, timothy, tall oat, meadow soft grass, floating fescue, rye grass, reed meadow, smooth-stalked meadow, American cock's foot, upright bent or herd's grass, and tall fescue. And the five last are peculiarly suited to swamp or *bog soils*. For *dry loams, sands, and gravels*, which never ought to be kept long in grass, the cock's foot or orchard grass, and tall oat, are probably the best; and to these might be added red and white clover.

"The great difficulty is to prevent the deterioration of meadows. This takes place from the better grasses running out, and giving place to coarser kinds, in moss, and to useless or noxious plants, aided often by a neglect to keep them well drained. The finer and more nutritious kinds thrive best in *moist*, though they will not live long in *wet* soils. Hence it is of the first importance to keep the surface soil free from standing water, by good and sufficient ditches; and it often becomes necessary, and it is in most cases advisable, on a flat surface, to lay the land in ridges at right angles with the drains. Another precaution to be observed is, not to feed them with stock when the soil is wet and poachy. Harrowing in the fall has been found beneficial to meadows. It destroys mosses, and covers the seeds of grasses which have fallen, or may be sown, and thus produces a continued succession of young plants. In Europe, lime is used with good effect as a top dressing to grass lands, as are also ashes. With us, the annual application of a bushel of gypsum to the acre is found beneficial. It not only thickens the verdure with clover, but is of advantage in most other grasses. Stable manure should be used only when it can be spared from the more profitable uses of tillage. When the means above enumerated fail to insure a good crop of hay, it is time to resort to the plough, and a course of crops.

“3. *Pasture Grasses.* But few of the grasses most valued in Great Britain for pasture are the natural growth of the United States; but it is believed that if the seeds are once introduced upon our farms, we shall find little difficulty in naturalizing them. Neither the orchard nor vernal grass, which are said to be indigenous to our country, are recognised in the grass lands which have come within my observation: yet they constitute, with fox tail and tall oat grass, the earliest and most valuable varieties for perennial pastures. The meadow fox tail and orchard grass, together with our white clover and green meadow grass, *poa trivialis*, (which seldom require to be sown,) I think would form the best selection for all grounds which are moderately dry. The rye and oat grasses, or meadow soft grass, might be either substituted for the two first, or combined with them. These would afford spring, summer, and fall feed, abundant in quantity and wholesome and nutritious in quality. On wet soils, (though pastures require to be drained, as well as meadows, to insure a rich herbage,) the tall fescue, smooth-stalked meadow, upright bent, and herd's grass, may be introduced to advantage. Gypsum is applied to pastures with the same benefit that it is to meadows.”

Two able papers, “*On Grasses*,” have been written by the Hon. John Welles, for “The Massachusetts Agricultural Repository.” One of these, republished in “The New England Farmer,” (Vol. I. page 235,) contains the following observations on the loss of weight of certain grasses, by evaporation, “in the process of drying or making, for safe and useful preservation.”

It should be premised that the time of cutting the several grasses, &c., in the following statement, was the same as is usually practised by husbandmen in this State.

“Of 100 lbs. of vegetables, cured in 1822, the product was as follows, viz.:

100	lbs.	of green white clover	gave	of hay	17½	lbs.
100	“	of red	do.	“	27½	“
100	“	of herd's grass		“	40	“
100	“	of fresh meadow		“	38	“

100	lbs.	of salt grass	gave of hay	39	lbs
100	"	of mixed 2d crop, English rowen	"	18¾	"
100	"	of corn stalks	"	25	"
100	"	of do. cut in the milk with the ear	"	25	"

"It is to be observed, that the weight will vary from ripeness, and many other causes, such as wetness of season, shade, thickness of growth, &c."

In a subsequent number of "The Massachusetts Agricultural Repository," was published another elaborate communication from the same pen, from which the following table is extracted.

Table showing the loss of weight in drying grasses.

				1822.	1823.
100	lbs.	of green white clover*	gave	17½	27
100	"	of red† clover	"	27¾	25
100	"	of herd's grass	"	40	39
100	"	of fresh meadow	"	38	44
100	"	of salt grass‡	"	39	60
100	"	of 2d crop, or English rowen	"	18¾	19
100	"	of corn stalks	"	25	25
100	"	of spiked oat grass	"		50
100	"	of red top	"		46
100	"	of Rhode Island	"		40
100	"	of couch grass	"		43
100	"	of marine black grass	"		38

On Sowing Grass Seeds. A diversity of opinion exists relative to the best time for sowing grass seeds. Some prefer the fall; but the majority of those who have written on the subject, recommend sowing in the spring; and that season, so far as our acquaintance extends, is most generally chosen. European writers direct, even when grass seed is sown on the same ground with winter grain, to sow the grass seed in the spring, and *harrow it in.* They say that the harrowing will on the whole be of service to the grain, though a few of the plants will be torn up by the process. The Hon. Richard Peters likewise directed to "harrow your winter grain in the spring, in the direction of the seed furrows, or drills, and be not afraid of disturbing a few plants; manifold produce will remunerate for the destroyed."

"The Farmer's Assistant" says, "Clover may be sown with barley, oats, or spring wheat, when that article is rais-

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* The white clover of 1822 was taken in the shade; that in 1823, from a light warm soil exposed to the sun.

† The red clover in 1823 was taken in the first year of its product, in close growth, and for that reason falls short of 1822.

‡ The salt grass of 1822 was, I have reason to suppose, a second growth, which accounts for the difference of the two years.

If enabled, experiments will in these cases be hereafter given, so as to fix the result with sufficient accuracy ed; or it may be sown with winter wheat in the fall, if the land be dry and warmly exposed; or in the spring, when it should be lightly harrowed in." The "Domestic Encyclopedia" asserts, that "experienced farmers generally prefer sowing clover with wheat rather than with barley or oats, as in dry seasons the clover frequently overpowers the oats or barley, and if it be sown late in order to obviate this evil, it often fails, and the crop is lost for that season. Probably the diversity of opinion respecting the proper time of sowing clover seed may arise from the difference in the nature of the soil on which trials have been made. An experienced agriculturist, (Edward Duffield, Esq., of Philadelphia county,) assures Dr. Mease, that he repeatedly failed in obtaining a crop, when he sowed his clover in autumn or winter; and he is uniformly successful when he sows in the spring. His soil is a light loam."

On the other hand, an experienced and scientific cultivator, whose suggestions on this subject were published in "The New England Farmer," (Vol. VI. p. 238,) dated Weston, and signed J. M. G., says; "Dear-bought experience has taught me the inefficacy of sowing grass seed in spring with grain; it was a custom imported with the ancestors of the country from Old England, where the cloudy summers and moist climate will warrant a practice which, under our clear sky and powerful sun, is altogether unsuitable. I must add, that grass sown in the fall imperiously requires to be rolled in the spring, as soon as the ground is in fit order; otherwise the small plants, slightly rooted yet, and heaved up by the frost, will suffer much, perhaps total destruction; and truly, among the many uses to which the roller may be applied, none, perhaps, would be more valuable than to roll *all* grass lands in spring. The plants suffer from the wind and from the heat, and this being the case more or less every spring, it must necessarily bring on a premature decay, which the yearly use of the roller at that season might prevent."

We cannot reconcile these authorities; but it is probable that both in fall and spring sowing of grass seeds, there may be successful and unfavorable results, according to circumstances of soil, season, &c. Fall sown grass seeds are liable to be winter-killed, or destroyed by frost; spring sown grass seeds may perish by drought and heat. But, whenever sown, there will be less danger either from frost or drought, if the seed is well covered with a harrow, and the ground pressed on it with a roller

Young's "Farmer's Calendar," under the date of August, says, "This is the best season of the whole year for laying down land to grass; and no other is admissible for it on strong, wet, or heavy soils. Spring sowings with grain may succeed, and do often, but that they are hazardous I know from forty years' experience."

There is likewise a great difference of opinion as respects the *quantity of seed* to be sown when land is laid down to grass. Sir John Sinclair says, "It is a great error, in laying land down to grass, to sow an insufficient quantity of seeds. In general, twelve or fourteen pounds of clover is the usual average allowance. But that quantity, it is contended, ought greatly to be increased, and in many cases doubled." "The Farmer's Assistant" tells us, that "the quantity of red clover seed to be sown on the acre is about fourteen pounds, and none but clean seed ought to be sown."

The "Memoirs of the Board of Agriculture of the State of New York," (Vol. II. p. 30,) in giving an account of the methods of culture adopted by farmers in Rensselaer county, state, that "Farmers differ in opinion in regard to the most suitable quantity of seed. S. Germond, H. Worthington, C. Porter, C. R. Colden, and some others, say that eight quarts of the mixture of clover and timothy seed should be sown on every acre. And colonel J. Carpenter sows sixteen quarts on an acre. He says, when the grass and clover grow very thick, it will be more tender feed, and more fine hay, and that it will not run out so soon. But J. Phillips, G. Eddy, and many others, consider four quarts as sufficient.

"All agree that the proportions of the mixture of the seeds should be governed by the nature of the soil: that in a sandy soil three-fourths of the seed should be clover; in clay loam it should be equal parts; in clay soil but one fourth clover seed.

"There should be at least a bushel of plaster sown on every acre of clover and grass land of a sandy, gravelly, or loamy soil. Also on all upland natural meadows. Two bushels per acre are much better than one on sandy or gravelly soil."

Payson Williams, Esq., of Fitchburg, Massachusetts, who received a premium from the Massachusetts Agricultural Society for the greatest quantity of spring wheat, raised by him in the summer of 1822, in giving a description of the mode of culture by him adopted, says, "The quantity of grass seed used by me is never less than twelve pounds of clover and one peck of herd's grass (timothy) to the acre. Here, permit me to observe, that innumerable are the instances in this country where the farmer fails in his grass crops by not allowing seed enough ; and, what is worse, the little he does give with a sparing hand is suffered to take its chance under that pest of agriculture called the bush harrow, which not only drags stones and other loose matters into heaps, but leaves the soil dead and heavy, and does not cover the seed deep enough to strive with our July drought effectually."

We have, however, been verbally assured, by very correct and scientific agriculturists, that six or seven pounds of clover seed, *where the ground is highly manured*, is amply sufficient, and that by exceeding that quantity the plants so shade and stifle each other that there is little substance in the hay made from them. No doubt much depends on the quality and richness of the soil. The poorer the soil the greater the quantity of grass seed. Clover seed of a bright yellow, with a good quantity of the purple and brown colored seed among it, (which shows the maturity of the seed,) should be preferred.

GRAIN. Grain, strictly speaking, signifies seeds, growing in spikes or ears, and includes wheat, rye, barley, oats, &c. Of the culture of these we shall treat under those heads, respectively. We shall here give some directions for improving grain of any sort which has become musty, or sour.

"The wheat [or other grain] must be put into any convenient vessel, capable of containing at least three times the quantity, and the vessel must be subsequently filled with boiling water; the grain should then be occasionally stirred, and the hollow and decayed grains (which will float) may be removed; when the water has become cold, or, in general, when about half an hour has elapsed, it is to be drawn off. It will be proper then to rinse the corn [grain] with cold water, in order to remove any portion of the water which had taken up the must; after which, the corn being completely drained, it is, without loss of time, to be thinly spread on the floor of a kiln, and thoroughly dried, care being taken to stir and to turn it frequently during this part of the process."—*Code of Agriculture.*

Indian Corn. Indian corn, or maize, as it is sometimes called, is a very important crop. The celebrated English agriculturist, Arthur Young, in speaking of the agriculture of France, observed, "The line of maize [corn] may be said to be the division between the good husbandry of the south and the bad husbandry of the north of the kingdom; till you meet with maize, very rich soils are fallowed, but never after. Perhaps it is the most important plant that can be introduced into the agriculture of any country, where climate will suit it. The only good husbandry in the kingdom (some small rich districts excepted) arises from the possession and management of this plant. For the inhabitants of a country to live upon that *plant*, which is the preparation for wheat, and at the same time keep their cattle fat upon the leaves of it, is to possess a treasure for which they are indebted to their climate." The perfect tillage and plentiful manuring requisite for Indian corn make it an excellent substitute for a summer fallow; it is a crop not liable to be injured by too much or too coarse manure; it not only enables, but, as it were, forces the farmer in the course of its culture to subdue his land and exterminate weeds.

Soil. A light loomy soil is best for this crop, and even if sand greatly predominates it will produce good corn with the help of manure. Corn will not flourish on lands in which clay is the chief ingredient, and which are therefore stiff and wet.

Preparation. "The best preparation for a corn crop is a clover or other grass lay, well covered with a long manure, recently spread, neatly ploughed, and harrowed lengthwise of the furrow. A roller may precede the harrow with advantage. The time of performing these operations depends on the texture of the soil and the quality of the sod. If the first is inclining to clay, or the latter tough, or of long continuance, the ploughing may be performed the preceding autumn; but where sand or gravel greatly preponderate, or the sod is light and tender, it is best performed in the spring, and as near to planting as is convenient. The harrow, at least, should immediately precede planting. All seeds do best when put into the fresh stirred mould. Stiff lands are ameliorated and broken down by fall ploughing; but light lands are rather prejudiced by it. When corn is preceded by a tilled crop, the ground should be furrowed, and the seed deposited in the bottom of the furrows. Where there is a sod, the rows should be superficially marked, and the seed planted on the surface. Where the field is flat, or the sub-soil retentive of moisture, the land should be laid in ridges, that the excess of water which falls may pass off in the furrows.

' *The time of planting* must vary in different districts, and in different seasons. The ground should be sufficiently warmed by vernal heat, to cause a speedy germination. Natural vegetation affords the best guide. My rule has been to plant when the apple is bursting its blossom buds, which has generally been between the 12th and 20th of May.

' *Preparation of the seed.* The enemies to be combated are the wire-worm, brown grub, birds, and squirrels. Of these, the first and two last prey upon the kernels, and against these tar offers a complete protection. I soak my seed twelve to twenty hours in *hot* water, in which is dissolved a few ounces of crude saltpetre, and then add (say to eight quarts of seed) half a pint of tar, previously warmed, and diluted with a quart of warm water. The mass is well stirred, the corn taken out, and as much plaster added as will adhere to the grain. This impregnates and partially coats the seed with tar. The experience of years will warrant me in confidently recommending this as a protection for the seed.

" *The manner of planting* is ordinarily in hills from two and a half to six feet apart, according to the variety of corn, the strength of the soil, and the fancy of the cultivator. The usual distance in my neighbourhood is three feet. Some, however, plant in drills of one, two, or three rows, by which a greater crop is unquestionably obtained, though the expense of culture is somewhat increased. The quantity of seed should be double, and may be quadruple* what is required to stand. It is well known that a great difference is manifest in the appearance of the plants. Some appear feeble and sickly, which the best nursing will not render productive. The expense of seed, and the labor of pulling up all but three or four of the strongest plants in a hill, it is believed will be amply remunerated by the increased product. If the seed is covered as it should be with mould only, and not too deep, we may at least calculate upon every hill or drill having its requisite number of plants.

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* Messrs. Pratts, of Madison county, New York, obtained the prodigious crop of one hundred and seventy bushels per acre, and used seven bushels of seed to the acre, the plants being subsequently reduced to the requisite number.

"*The after culture* consists in keeping the soil loose and free from weeds, which is ordinarily accomplished by two dressings, and in thinning the plants, which latter may be done the first hoeing, or partially omitted till the last. The practice of ploughing among corn and of making large hills is justly getting into disrepute; for the plough bruises and cuts the roots of the plants, turns up the sod and manure to waste, and renders the crop more liable to suffer by drought. The first dressing should be performed as soon as the size of plants will permit, and the best implement to precede the hoe is the corn harrow, adapted to the width of the rows, which every farmer can make. This will destroy most of the weeds, and pulverize the soil. The second hoeing should be performed before or as soon as the tassels appear, and may be preceded by the corn harrow, a shallow furrow with the plough, or, what is better than either, by the cultivator. A slight earthing is beneficial, provided the earth is scraped from the surface, and the sod and manure not exposed. It will be found beneficial to run the harrow or cultivator a third, and even a fourth time between the rows, to destroy weeds and loosen the surface, particularly if the season is dry.

"*In harvesting the crop*, one of three modes is adopted viz.: 1. The corn is cut at the surface of the ground when the grain has become glazed or hard upon the outside, put immediately in stooks, and when sufficiently dried the corn and stalks are separated, and both secured. 2. The tops are taken off when the corn has become glazed, and the grain permitted to remain till October or November upon the butts. Or, 3. Both corn and stalks are left standing till the grain has fully ripened and the latter become dry, when both are secured. There are other modes, such as leaving the butts or entire stalks in the field after the grain is gathered; but these are so wasteful and slovenly as not to merit consideration. The stalks, blades, and tops of corn, if well secured, are an excellent fodder for neat cattle. If cut, or cut and steamed, so that they can be readily masticated, they are superior to hay. Besides, their fertilizing properties as a manure are greatly augmented by being fed out in the cattle yard and imbibing the urine and liquids which al ways there abound, and which are lost to the farm in ordinary yards, without abundance of dry litter to take them up. By the first of these methods, the crop may be secured before the autumnal rains; the value of the fodder is increased, and the ground is cleared in time for a winter crop of wheat or rye. The second mode impairs the value of the forage, requires more labor, and does not increase the quantity or improve the quality of the grain. The third mode requires the same labor as the first, may improve the quality of the grain, but must inevitably deteriorate the quality of the fodder. The corn cannot be husked too promptly after it is gathered from the field. If permitted to heat, the value of the grain is materially impaired."

To the above directions (which are quoted from an excellent article written by J. Buel, Esq., of Albany, originally published in "The Genesee Farmer,") we shall add some further particulars from various sources.

A writer for Goodsell's "Genesee Farmer," with the signature W. P. W., recommends wetting seed corn with soft soap, and rolling it in plaster, and gives the details of an experiment which tested the utility of this practice.

William Clark, Jun., of Northampton, Massachusetts, published an article on the culture of corn in "The New England Farmer," (Vol. XI. p. 337,) giving in detail a number of experiments, which favored the opinion that an equal distance each way is the best method of planting corn ; and that on soil "similar to what I have described, [a sandy loam somewhat exhausted by neglect and severe cropping, manured with about twenty cart loads of compost to the acre,] about nine square feet of surface is sufficient ground for one hill." That is, the hills were three feet apart each way from centre to centre ; but he does not state how many kernels were planted, nor how many plants were suffered to remain in a hill.

It has often been stated that great advantage was derived from selecting seed corn from stalks which had borne two or more ears. "The Hampshire Gazette," published at Northampton, Massachusetts, mentions a farmer who "has selected his seed corn in this way for three years past, and the result has exceeded his expectation. He states, that it is not uncommon to find in his corn-field this season [1831], stalks with three, four, five, and sometimes six ears, and three of them fair, full grown, and fit for seed, and that too in hills containing four or five stalks." He says, "I think my crop has been increased several bushels this year by the experiment. I would suggest a mode of selecting seed to those who do not cut up the corn at the roots. When they are picking corn, and find a stalk with two or more ears, let them tie the husks together, and the ears will be easily known at husking."

A solution of copperas in water has been recommended as forming a good preparation for seed corn. Mr. J. Ellsworth, of Ketch Mills, Connecticut, in a communication published in "The New England Farmer," (Vol. X. p. 331,) stated as follows:

"Last year I soaked our seed corn in very strong copperas water, as near as I car recollect from twenty-four to thirty-six hours; every kernel was made as black as charcoal; the man who planted the corn called me a fool, and said it would never vegetate. But every hill planted came up well, and during its growth excited the remarks of all who saw it, as being the most even field of corn they ever saw. Not one hill in the whole seven acres was injured by worms; and we had often in previous years been compelled to replant several times, when it had been cut down by the worms. We had over sixty bushels to the acre." Copperas water will not preserve corn against the *cut-worm*, which eats off the young plants at or just below the surface of the ground. It has been often asserted, (but we have not known it tested by experiment,) that the kernels of corn from the but-ends of the ears are better for seed than those from any other part of the ear. It is said that the nearer the seed is taken from the largest end, the larger the product. Others recommend to reject some part of both ends, and plant only seeds taken from the middle. Further experiments are desirable to ascertain these points.

"The following table," says Judge Buel, "exhibits the difference in product of various methods of planting, and serves also to explain the manner in which large crops of this grain have been obtained. I have assumed in the estimate that each stock produces one ear of corn, and that the ears average one gill of shelled grain. This is estimating the product low; for, while I am penning this, (October,) I find that my largest ears give two gills, and one hundred fair ears half a bushel of shelled corn. The calculation is also predicated on the supposition that there is no deficiency in the number of stocks, a contingency pretty sure on my method of planting.*

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* Planting an extra number of plants and thinning them at the first or second hoeing.

	hills.	bush.	qts.
1. An acre in hills four feet apart each way will produce	2722	42	16
2. The same, three feet by three	4840	75	20
3. The same, two by two and a half feet	5808	93	28
4. The same, in drills at three feet, plants six inches apart in the drills	stalks. 29,040	118	14
5. The same in do., two rows in a drill, six inches apart, and the plants nine inches, and three feet nine inches from centre of drills, thus : . . . . . ———	30,970	120	21
6. The same in do., three rows in a drill, as above, three feet from centres of drills, thus :	43,560	170	5

"The fifth mode I have tried. The ground was highly manured, the crop twice cleaned, and the entire acre gathered and weighed accurately the same day. The product in ears was one hundred and three bushels, each eighty-four pounds net, and sixty-five pounds over. The last bushel was shelled and measured, which showed a product on the acre of one hundred and eighteen bushels ten quarts. I gathered at the rate of more than one hundred bushels to the acre from four rods planted in the third method, last summer, the result ascertained in the most accurate manner. Corn shrinks about twenty per cent. after it is cribbed. The sixth mode is the one by which the Messrs. Pratts, of Madison County, obtained the prodigious crop of one hundred and seventy bushels per acre. These gentlemen, I am told, are of opinion, that the product of an acre may be increased to two hundred bushels."

We believe that nearly all the large and premium crops which have been noted in the annals of agriculture, were procured by planting the corn in drills, either single, double, or treble. There has, however, been a difference in opinion relative to planting corn in ridges or on a flat surface. This, we think, depends on the nature of the soil. A loamy soil, or such as is proper for corn, ought, in our climate, to be cultivated in a flat way, that it may the better retain moisture. Dr. Black, of Delaware, advises to plant corn in such a manner that the rows may run directly *north and south*. General Hull, of Newton, Massachusetts, in cultivating a premium crop of corn, "drew furrows *north*

and south three and a half feet apart. No ridges were formed. Hills were then made with the hoe in those furrows two feet apart, *not flat, but descending to the south, with a small bank on the north side of each hill*, for the purpose of giving the young plants a fairer exposure to the sun.'

When corn is planted on greensward land, the holes for the hills or drills should be made quite through the furrows, and dung put into the holes. If this caution be not observed the crop will be uneven, as the roots in some places, where the furrows are thickest, will have but little benefit from the rotting of the sward. But if the holes are made through, the roots will be fed with both fixed and putrid air, supplied by the fermentation in the grass roots of the turf.*

Some entertain an idea, that it is injurious to stir the soil when it is dry and the plants are suffering for want of rain. The error of this supposition is well exposed, in an article written by the Hon. J. Lowell, headed, "*Stirring the Earth a Relief against Drought*," published in "The Massachusetts Agricultural Repository." The following is an extract :

"In this extraordinary [very dry] season, I had a small patch of early potatoes, planted in a warm and sandy soil, purposely to procure an early crop ; the soil was, at least, three-quarters pure sand, mixed with some food for plants among the sand. The severe drought threatened a total loss of the crop. The potato stalks were feeble, drawn up, scarcely larger than goose quills, and I expected every day to see them wither; all hopes of a crop were abandoned. I thought that they were the fair subjects of a *desperate* experiment. On one of the hottest and driest days, I gave them a thorough ploughing, passing the plough four times through each row; first ploughing two furrows from the hills, as near the roots as possible without throwing out the seed potatoes, and then returning the loam or earth instantly back by two other furrows. No rain intervened for ten days. In three days after, the potatoes changed their color, they started afresh as if they had received the benefit of ample showers, while not a drop of rain had fallen.

"The dews, which were abundant, settled upon the new turned earth, while before the ploughing no moisture had been apparent.

"The last fact, though it cannot have escaped the notice of the most careless cultivator, has not been as yet explained. We can easily see, that a soil rendered porous would more readily and easily convey its moisture to the roots. It becomes like a sponge, and is readily permeable, or rather readily permits the moisture to pass between the particles. But it is not yet understood why it attracts the moisture. Perhaps, however, it may be owing to its presenting a much greater surface to the moist air of the night. The fact, however, which is what *most concerns us*, is settled. Perhaps some of the experiments of our distinguished countryman Dr. Wells, a physician of London, who rendered himself distinguished by his remarks on dew, may tend to explain this fact, though it is not my purpose to examine the theory.

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* Deane's New England Farmer.

"Every man who feels an interest in the question, can satisfy himself at once by stirring a small piece of earth in a time of severe drought, and if he does not find it in the morning more filled with moisture than the undisturbed ground in its vicinity, let him continue an unbeliever.

"But there is another mode, and it is one which I have never heard suggested, by which I apprehend the stirring ot the surface, and making it light and porous, is beneficial in great droughts. It is this: light porous bodies are bad conductors of heat: perhaps because they have more air beween their interstices. The facts are familiar to us. Meallic bodies acquire an intense heat under the rays of the sun; so do stones in proportion to their density. The earth, when very compact, will become exceedingly hot, but garden loam, which is very porous, remains cool at noonday two inches below the surface. I believe, therefore, that moving the surface, and keeping it in a light and porous state enables it to *resist the heat of the sun's rays*; that the air between the particles of earth communicates the heat more slowly than the particles themselves do when in close contact.

"Such is my theory, but I am an enemy to theories. I always distrust them; I look only to facts; and having observed that a slight covering of half an inch of seaweed would preserve my strawberries from drought, which can only arise from its lying so loose on the surface, I have been led to infer that the undoubted fact, that soil in a loose pulverized state resists drought, is owing to the same cause, to wit, the slowness with which the heat of the solar rays is communicated to the roots. But, be the theory sound or unsound, I am persuaded that every farmer will find that the free use of his plough and hoe, in times of severe drought, will be of more value to him than as much manure as that labor would purchase. I have always been convinced, from my experience as an horticulturist, that the great secret in cultivation consists in making the soil porous. In raising exotic plants we know it to be true, and our flower-pots are always supplied with soil the most porous which we can obtain. The farmer may borrow light from an occupation which he looks upon with disdain, but which serves to elucidate and explain the secrets of vegetation."

Corn is sometimes profitably planted or sown for fodder. In an "Address to the Essex Agricultural Society," by the late Colonel Pickering, we find the following remarks:

"Every farmer knows how eagerly cattle devour the entire plant of Indian corn in its green state; and land in good condition will produce heavy crops of it. Some years ago, just when the ears were in the milk, I cut close to the ground the plants growing on a measured space, equal as I judged to the average product of the whole piece; and found that, at the same rate, an acre would yield twelve tons of green fodder; probably a richer and more nourishing food than any other known to the husbandman. And this quantity was the growth of less than four months." * * * * * "It has appeared to me that the sort called sweet corn, yields stalks of richer juice than the common yellow corn. It is also more disposed to multiply suckers, an additional recommendation to it, when planted to be cut in a green state for horses and cattle, and especially for milch cows; and the time of planting may be so regulated as to furnish supplies of food just when the pastures usually fail. I am inclined to doubt whether any other green food will afford butter of equal excellence."

Colonel Pickering recommended planting northern corn in preference to southern corn, when fodder is the object He observed, that "the green stalks of our northern corn are incomparably sweeter than those of the southern States, at least when both sorts are grown in the north."

Corn intended for fodder may be sowed either broad-cast or in drills. The former is the least trouble, the latter will give the greatest produce, and leave the soil in the best order.

If the land on which you propose to raise your corn is mowing or pasture, fresh ploughed for the purpose, broadcast sowing will be best, as the sod after being turned over should not be disturbed, and there will not, probably, be much to apprehend from weeds. If you sow broad-cast, from three to three and a half bushels to an acre are recommended, though some say that a larger quantity will be still better. If in drills, you will run light furrows about three feet asunder, three or four inches deep, and drop the seed corn in the furrows, about as thick as peas are sown for field cultivation. The seed may be covered with the plough ; and a harrow drawn lengthwise of the furrows, followed by a roller, (if you have one,) or perhaps your harrow turned bottom upwards, for want of a roller, will complete the planting. If you mean to dry it for winter use, it will be advisable to sow early in the season, for it will then be fit to cut at a time when it can be most easily cured for preservation in your barn, or other receptacle for fodder.

The following remarks on the culture of corn, are from the pen of the Rev. Mr. Colman, of Greenfield, Massachusetts, one of our best practical and scientific farmers.

"In the cultivation of this crop, it is in the first place important to secure an early kind, as the best security against backward springs and early frosts. A field of corn in Lexington, planted on the 21st of June, belonging to Mr. Daniel Chandler, yielded an ample crop, and was perfectly ripened. The seed was of the twelve rowed kind, much esteemed there, and easily procured. The kernel is small, but it yields as much to the acre, and weighs more to the bushel, than the eight rowed kind, with a larger kernel. Now a kind of this description, which will ripen in nine or ten weeks, in so unpropitious a season as the last, when there were few warm nights, which are generally considered most important to the forwarding of this crop, is certainly a great acquisition. It will be well to remark here, that it is not only important to procure an early kind, but it will require particular attention to keep it so. Plants, like animals, have a constant tendency to become accommodated to the place and season in which they grow. Indian corn brought from the north to the south will become later and require a longer season for its ripening, unless particular care is taken in the selection of the earliest ripe ears for planting; which is, that high manuring has a tendency, by rendering the growth of a plant more luxuriant and succulent, to retard its ripening and to lengthen its season.

"We are satisfied from long observation and experiment that an early planting of corn is generally and strongly to be recommended. The last season, it is true, formed an exception to this rule; but it was a rare case. Now, a kind of corn which by early planting and consequently early ripening gives an opportunity of laying down the same ground seasonably with winter grain and clover; or which, where the first plantings will afford us the prospect of a full crop, when the vacancies are not supplied or the planting cannot take place until after the middle of June, certainly is a great object to farmers.

"The kind of land best suited to this crop, I am satisfied, is greensward, completely inverted, rolled, and so cultivated as not during the whole season to disturb or break the sod which has been turned over. This is a point of great importance; for the decomposition of the vegetable matter in the ground, which is effectually secured in this way, but entirely lost by the common mode of cultivation, will greatly contribute to the nutriment and vigor of the plant, supplying in fact an amount of manure greatly beyond what any conjectures would have made it, had not an exact experiment determined that in ordinary cases it may be rated over twelve tons of vegetable matter to the acre.

"In the next place we protest against the practice of very deep ploughing for this crop, and that of burying the manure deeply under the sod. The depth of ploughing may be in some measure regulated by the nature of the soil; but three or four inches in sward land may be regarded as ample; and not so much as this, where this would carry you below the vegetable mould. All circumstances considered, I am satisfied that it is most eligible to spread the manure upon the surface, ploughing it in with a very light plough and harrow; and though something may be lost in this way by evaporation, yet not so much as burying it under the sod; and the land is left in much better condition for the next crops where the manure is thus spread, than where it is placed in the hill; nor is the corn so like to suffer from the drought, and the saving is considerable."

NEAT CATTLE. Neat cattle form a very important part of every farmer's live stock. In selecting them, two things are very material: first, the health and soundness of the stock from which they are purchased; and secondly, the quality of the soil on the produce of which it is intended to feed them. Stock for the dairy or the butcher should be selected from a breed of which you know or can ascertain every particular relative to their general health and soundness, and the manner in which they have been reared, including their food, shelter, &c.

"The Farmer's and Grazier's Complete Guide," by B Lawrence, an English writer, observes, "Much has been written as to what breeds are the best; and a considerable greater stress has been laid on this part of the question than is borne out by any positive result; there are good and bad of all kinds; and provided you select sound and healthy animals from warranted stock, you will, if you treat them properly, have little to care for and less to fear.

"Always purchase cattle that have been fed on lands of a *poorer* quality than your own; but you must not too suddenly put them to the richer food, or they will be liable to several dangerous diseases. It rarely happens, however, that cattle purchased from rich lands thrive well on poor soils; but, on the contrary, those from poorer farms do well on good land. The choice of neat cattle, therefore, for the stocking of farms, must, in a great degree, be regulated by the nature and quality of the soil intended to feed them on.

"It is also essential that the cattle should be young, as well as healthy and of sound constitution; for the younger they are, the more likely they will be to do service. Their age may easily be known by the teeth; like sheep, they have no fore teeth in the upper jaw; it is in the lower, therefore, by which this must be determined: the horns also afford some guide in this respect.

"The eight fore teeth of the lower jaw are shed, and replaced by others which continue through life: the two middle fore teeth fall out at about two years old, and are succeeded by others not so white. At three years old they have two more next to those of the previous year; and thus by the two succeeding years all the fore teeth are renewed; they are then termed full mouthed, and are five years old. At the sixth year the row is even, the last two being completely up. Besides these they have ten grinders in each jaw.

"At the age of three years the horns are smooth and even; in the course of the fourth year, a wrinkle or circle forms round the basis of the horn near the head; this is every year succeeded by another, which always seems to move the other forward. In looking therefore at the horns of neat cattle, if the first circle be considered as three years, it will be an easy task to tell the age of the beast at any subsequent period. An implicit reliance cannot, however, be placed on these marks, particularly in purchasing of strangers, or cow jobbers, such persons having been known to file down some of the animal's teeth, and alter the appearance of the horns so as to give them the semblance and marks of young cattle of the most valuable breeds, and pass them off as such to strangers."

Cows for the Dairy. In selecting cows for the dairy, the following indications should be attended to. Wide horns, a thin head and neck, dew-lap large, full breast, broad back, large deep belly ; the udder capacious but not too fleshy ; the milch veins prominent, and the bag tending far behind ; teats long and large ; buttocks broad and fleshy ; tail long, pliable, and small in proportion to the size of the carcass, and the joints short. The Alderney breed gives a very rich milk. The Durham short horns, however, exceed them as respects quantity ; and we have the testimony of the Hon. Levi Lincoln, late governor of Massachusetts, that the milk of Denton's progeny, a branch of that race, is not only abundant, but of excellent quality.*

Cows should be milked regularly morning and evening, and as nearly as may be at the same hours. At six in the morning and six at night is a good general rule, as the times of milking will be equi-distant from each other. But if they are milked three times a day, as Dr. Anderson recommended, the times may be five, one, and eight. He asserted that if cows were full fed, they will give half as much again if milked three times as if only twice. At the same time, it would prevent too great a distension of their bags, to which the best cows are liable.

The cow which is desired to remain in perfection, either for milking or breeding, should not be exhausted by drawing her milk too long after she becomes heavy with calf. It is paying too dear for a present supply of milk. She should be suffered to go dry at least two months before calving.

The expense of keeping cows of a poor breed is as great and sometimes greater than that of keeping the best. If cows are poorly kept the difference of breeds will scarcely be discernible by the product of their milk. Some have therefore supposed that it is the food alone which makes the odds in the quantity and quality of the milk. This supposition is very erroneous, as may be shown by feeding two cows of a similar age, size, &c. on the same food, the one of a good breed for milk and the other of a different kind, and observing the difference in the milk product. No farmer, unless he is very rich, can afford to keep poor milch cows. He might almost as well keep a breed of "naked sheep," such as Swift mentions in "Gulliver's Travels." The farmer who raises a heifer calf that is from a poor milker, or of a breed of little value, is as foolish as he would be, if, in clearing land, he should burn on the ground the birch, maple, and walnut, and save white pine and hemlock for fire wood. And yet many sell the calves of the best milch cows to the butchers, because such calves are fattest !

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* See New England Farmer, Vol. IV. p. 318.

Those cows which give the greatest quantity of thin milk are most profitable for suckling calves, for rich milk is said not to be so proper food for calves as milk which is less valuable for dairy purposes. Milk which contains a large proportion of cream is apt to clog the stomachs of calves; obstruction puts a stop to their thriving, and sometimes proves fatal. For this reason it is best that calves should be fed with the milk which first comes from the cow, which is not so rich as that which is last drawn.

Mr. Russel Woodward, in the "Memoirs of the New York Board of Agriculture," says, "I have found that young cows, the first year that they give milk, may be made with careful milking and good keeping to give milk almost any length of time required. But if they are left to dry up early in the fall, they will be sure to dry up of their milk each succeeding year, if they have a calf near the same season of the year; and nothing but extraordinary keeping will prevent it, and that but for a short time. I have had them dried up of their milk in August, and could not by any means make them give milk much beyond that time in any succeeding years."

A writer in the "Bath and West of England Society's Papers," states, that if at any time a good milch cow should go dry before her milk is gone, get a young calf and put it to her in order to preserve her milk against another year; for it is well known, if a cow goes dry one year, nature will lose its power of acting in future.

Cows should be treated with great gentleness and soothed by mild usages, especially when young and ticklish, or when the paps are tender; in which case the udder ought to be fomented with warm water before milking, and touched with great gentleness, otherwise the cow will be in great danger of contracting bad habits, becoming stubborn and unruly, and retaining her milk ever after. A cow never gives down her milk pleasantly to a person she dreads or dislikes. The udder and paps should be washed with warm water before milking, and care should be taken that none of the water be admitted into the milking pail.

The keeping of cows in such a manner as to make them give the greatest quantity of milk, and with the greatest clear profit, is an essential point of economy. Give a cow half a bushel of turnips, carrots, or other good roots per day, during the six winter months, besides her hay, and if her summer feed be such as it should be, she will give nearly double the quantity of milk she would afford if only kept during the winter in the usual manner; and the milk will be richer and of better quality.

The carrots or other roots, at nineteen cents a bushel, amount to about eighteen dollars; the addition of milk, allowing it to be only three quarts a day for three hundred days, at three cents a quart, twenty-seven dollars. It should be remembered, too, that when cows are thus fed with roots they consume less hay, and are less liable to several diseases, which are usually the effects of poor keeping.*

The keeping of cows is very profitable. Allowing one to give only six quarts a day, for forty weeks in each year, and this is not a large allowance, her milk at two cents per quart will amount to upwards of thirty-three dollars; which is probably sufficient to purchase her and pay for a year's keeping.*

" A farmer some years since kept eighteen cows on a common, and was often obliged to buy butter for his family The common was enclosed, and the same person supplied his family amply with milk and butter from the produce of four cows well kept.

" Great milkers seldom carry much flesh on their bones, but they pay as they go and never retire in our debt. The difficulties in cow keeping are these: the expense of their food is considerable, more especially with respect to any which must be purchased, and if the produce be inconsiderable it may be a losing concern. You may be feeding a sparing milker into flesh, and if you stint her or allow her only ordinary food you get neither flesh nor milk."†

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* Farmer's Assistant.

† Mowbray on Poultry, &c.

Amateurs in this line should procure the largest milkers, and I had almost said give them gold, could they eat it. In this case it may be depended on, *milk is always of more value than the best cow-food*; and a cow, the natural tendency of which is to breed milk, will convert all nourishment, however dry and substantial, into that fluid; in fact, will require such solid kind of nourishment to support her strength and induce her to take the bull.*

Keep no more cows than you can keep well; one cow well fed will produce as much milk as two indifferently treated, and more butter; and if the cow be wintered badly, she will rarely recover, during the succeeding summer, so as to become profitable to the feeder. Cows should by all means be housed in extreme weather, and particularly those which give milk, or a failure in the quantity of milk will be experienced. Wherefore, instead of keeping twenty cows poorly fed and but half of them stabled, sell ten and give the remaining ten food in amount equal to what the twenty originally had; procure constant stabling for them, and you will receive quite as much milk and butter in return as was derived from the former mode of treating twenty. Sweet potatoes, carrots, pumpkins, and ground oats, are unquestionably among the best articles for food for milch cattle: and they occasion the milk and butter to assume a fine flavor and color, as well as increase of quantity.†

Winter Food for Cows. Mr. Chabert, the director of the veterinary schools of Alfort, had a number of cows which yielded very great quantities of milk. In his publications on the subject he observed, that cows fed in winter on dry substances give less milk than those which are kept on a green diet, and also that their milk loses much of its quality. He published the following receipt, by the use of which his cows afforded him an equal quantity and quality of milk during the winter as during the summer. "Take a bushel of potatoes, break them while raw, place them in a barrel standing up, putting in successively a layer of potatoes and a layer of bran, and a small quantity of yeast in the middle of the mass, which is to be left thus to ferment during a whole week, and when the vinous taste has pervaded the whole mixture, it is then given to the cows, who eat it greedily."

Pure water is an essential article for cows. Dr. Anderson says, he knew a man who acquired great wealth by attention to things of this nature, and one of his principal discoveries was, the importance of having a continued supply of the purest water which could be obtained for his cows; and he would on no account permit a single animal to set his foot in it, nor allow it to be tainted even by the breath of animals.

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* Mowbray on Poultry, &c.

† Trenton Emporium.

Parsnips cause cows to give milk in abundance, and that of the best quality.

Working Cows. An English cultivator, whose observations are published in the appendix to Plymley's "Survey of Shropshire," says, "Cows are fattened easier and are better laborers than oxen. The uses of cattle are to work, milk, and fatten. I have seen barren cows work as well as oxen; *they require less keep and walk faster.* When first I commenced farmer, I followed the example of my predecessor in feeding chiefly oxen; but I soon found that cows fattened much faster, and on less meal, and for some years past I have carefully avoided having any oxen in my stalls."

Cows which are shortly expected to calve ought to be lodged at night in some convenient place under cover for a week or two before calving, as it might be the means of saving the life of the calf, and perhaps of the dam likewise. The day and night after a cow has calved she should be kept under cover, and her drink should be lukewarm. Let her not be exposed for some time to the dampness of the night.

Cows which are near calving ought to be fed with better and more substantial food than usual. Grain of any kind is now useful, but it should be crushed, bruised, or coarsely ground. If the cleaning of a cow after calving be delayed, it may be promoted, according to Deane's "New England Farmer," by giving her a pail of warm water with some ashes in it; or, according to "The Grazier's Guide," the only thing to be given is toast and weak wine, or good cider or perry. If wine be preferred, mix it with an equal quantity of water. This toast should consist of four pints of wine and water, and about a pound and a half of bread toasted.

Inflamed teats should be washed with two drachms of sugar of lead in a quart of water. Should tumors appear, apply a common warm mash of bran with a little lard.

To prevent cows from sucking their own milk, it is said that rubbing the teats frequently with the most fetid cheese that can be procured is an effectual remedy.

In order that it may be ascertained what is the proper time for cows to go dry previous to their calving, an account should be kept of the time when each cow is put to bull, so that the cow may be dried off in due season. The following prescription for drying off cows is given in Monk's "Agricultural Dictionary."

"Take an ounce of powdered alum; boil it in two quarts of milk till it turns to whey; then take a large handful of sage, and boil it in the whey till you reduce it to one quart; rub her udder with a little of it, and give her the rest by way of drink; milk her clean before you give it to her; and as you see need repeat it. Draw a little milk from her every second or third day, lest her udder be overcharged."

Cow-house or Stable. The most healthy stables are those which are open to the east, or have an eastern aspect. It is a common practice to build them too close. The stable should never be completely closed up, however cold the weather may be, although it is desirable that strong draughts of cold or damp air should be guarded against, especially in winter. It may be held as a general rule, that stables or cow-houses are too close when on entering the breath is affected, or any smell of urine can be perceived.

It is also very important to keep cow-houses or cattle stables clean and well littered. Dung left in stables soon renders the air unwholesome, and is the cause of disorders. Cows in a stable should be allowed a square space of at least six feet each way for each cow. Two or three ventilators near the ground on the north side afford, at a trifling expense, an excellent way of renewing or sweetening the air in stables in the summer time, and on the south side in winter, without occasioning draughts; and these may be shut when necessary by means of straw, or, what is better, a sliding door.

It is of no small importance that the floor of a cow-house be very tight, so that none of the stale be lost, which is of great value as manure, when mixed with other substances. A farmer might as well lose the dung as the urine of his beasts.

"The common cattle stalls of our country are so ill contrived, and so straitened in their dimensions, that the cattle are constrained to lie down in part in their own dung. This dries and forms a thick coat on their hind quarters, from which they are not relieved till they shed their hair in the spring. They are thus rendered *uncomfortable*. To be uncomfortable is to suffer some degree of *pain* ; and no one will suppose that animals in *pain* can *thrive*, or preserve their plight with the same food equally with others perfectly at ease. Even hogs, though prone to wallow in the mire in warm weather, are always pleased with a dry bed, and thrive best when kept clean."*

The following, from the "Memoirs of the Pennsylvania Agricultural Society," is extracted from a letter from R. Smith to J. H. Powel, and will be of use in directing the most economical management of dairy cattle.

"My barn is constructed according to the best Pennsylvania models. The yard is to the south of it. On the east and west sides are cow-stables, containing one hundred and ten well made stalls, ventilated by a sufficient number of windows and double doors. At the tails of each range of cows there is a drain made of strong planks, and so fixed as to receive all their dung and urine. These several drains have a sufficient declivity to carry all the fluid matter to their southern terminations, where they intersect similar drains, which convey all this liquid manure into a cistern, fifty feet long. This cistern is so placed and constructed as to receive not only the urine of the stables, but also the liquid matter of the farm-yard. In it there is a pump, by means of which its contents are pumped into a large hogshead, fixed on a pair of wheels drawn by oxen. To the end of this hogshead is attached a box pierced with holes, into which this liquid manure floats through a spigot and faucet, and is then sprinkled over the ground as the oxen move forward."

Food for fatting Cattle, keeping Stock, &c. It has been often said, and we believe correctly, that it is not profitable, generally speaking, to fatten cattle on any kind of grain. Lawrence on Neat Cattle asserts, that "corn [by which is meant oats, barley, rye, peas, beans, wheat, &c.] cannot be used in the fattening of bullocks and sheep, except in seasons of superabundant plenty. Even Indian corn is often too costly food to be used solely, or principally, for the profitable fattening of cattle ; and grass, hay, and roots are the materials which true economy requires."† It is, however, asserted, that beef fattened on oil cake, raw potatoes, turnips, &c., will not be so firm, nor of so good a quality, other things being equal, as that which is fattened on Indian corn. If that be true, it might be well to commence feeding with turnips, potatoes, &c., and give the animals richer food as they increase in fatness.

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* Colonel Pickering.

† See a communication for "The New England Farmer," Vol. I. p. 234.

An able writer says, "With respect to feeding, the first rule is, little at a time, and often; because experience has shown that animals that eat much in a short time do not fatten so well as those which eat less but more frequently. The second rule is, to begin the course with cabbage and turnips, then to employ carrots and potatoes, and lastly Indian, oat, or barley meal. These aliments ought to be varied several times a day, and oftener if convenient; and instead of always reducing them to a meal, there is advantage in sometimes boiling them. A little salt given daily is very useful."

It would be advantageous to the community of farmers if something like the following experiments were made, and their results published. Let a number of cattle of similar or the same breed, age, propensity to fatten, as ascertained by handling, &c., be fattened at the same time. Let one be fed entirely on potatoes raw; a second on the same root steamed or boiled; a third made one half or two-thirds fat on potatoes, and his fattening completed with Indian corn; a fourth be fattened on Indian corn, or corn meal; a fifth be fed with a mixture of all these kinds of food, given together in the same mess, or in different messes. The first food in the morning, for the last-mentioned bullock, might be a small quantity of potatoes, pumpkins, or turnips; the second, ruta baga or carrots, mangel-wurzel, or parsnips. Then, as the last course of the day's feast, give Indian meal, or other food the richest you have. It would be well, likewise, to try the virtues of sweet apples. The most important object of such experiments, however, would be to ascertain whether the beef of cattle fattened on potatoes or other roots, raw or boiled or steamed, is *equal in quality* to that which is fattened on Indian corn. If not, whether an ox may not be made nearly fat enough for profit on roots and hay, his fatting completed on corn, and the flesh be as good as if he had been fattened wholly on corn. And if an ox partly fattened on roots, and his fattening completed on corn, gives as good beef as one wholly fed on corn, the question occurs, *how long a time* will it require to give the beef its good qualities arising from the corn? We know, as respects swine, that farmers make them partly fat on any thing which they will devour, and then feed them for some time before they are killed with Indian corn or meal, to "*harden the flesh*," as they express it ; and perhaps the same process will answer for beef cattle. Some farmers say that the red or La Plata potato, given raw to swine, make as good pork as that which is corn fed. Others say that any kind of potatoes, if steamed or boiled, will make as good pork as can be made of corn. If this be true of pork, it may be so of beef.

It is a truth which has been confirmed by repeated experiment, that food for *swine* fermented till it becomes a little acid will go farther and fatten them faster than unfermented food of the same quantity and quality. But it is not, I believe, generally known in this country, that *acid food* is most valuable for neat cattle in certain circumstances. Mr. Bordley, (a celebrated American writer on Rural Economy,) however, asserts, that oxen made half fat, or in good plight, on grass or turnips, are then finished, in France, upon a *sour* food, prepared as follows : *rye meal* (buckwheat or Indian meal may be tried) with water is made into *paste*, which in a few days *ferments* and becomes sour ; this is then diluted with water, and *thickened with hay*, cut into chaff, which the oxen sometimes refuse the first day, but when dry they drink and prefer it. All the husbandmen are decidedly of opinion that they fatten much better because of the *acidity*. They give it thrice a day, and a large ox eats twenty-two pounds a day. Maize [Indian] meal, or maize steeped till it is sour, should be tried. This sour mess is given during the last three weeks of their fattening, and they eat about seven and a half bushels of meal, value four dollars.

Care should be taken that the process of fermentation be not carried too far. The paste should not become mouldy, nor the liquid food in the slightest degree putrid. We think, moreover, that there is good reason for waiting till animals become "half fat," or in good plight, before they are fed with acid food. Acids, like alcohol, create appetite by stimulating the stomach, but if long continued they weaken the digestive powers, and in time entirely destroy the tone of the stomach. The animal will then be visited with what in a human subject would be called dyspepsia, or a want of the power of digestion ; fattening him will be out of the question, and he will be worth but little more than the value of his hide. The constitution of an ox may be destroyed by excessive eating, and it is only towards the close of his days, near the last stage of his preparation for the butcher, that he should be allowed to become an epicure, and indulged with as much as he can eat of rich and high-seasoned food.

Store keep should neither be too rich nor too abundant; and if an ox is once made fat and then loses his flesh, he is like one of Pharaoh's lean kine, the more he devours the leaner he becomes. If young cattle are kept in rich pastures in summer and poor fodder in winter, sometimes stuffed, at other times starved, they lose their disposition to fatten. To such cattle Mr. Lawrence alludes, when he says, "It is extremely imprudent indolently to continue to keep at high food animals which do not thrive ; I advert chiefly to individuals with which the first loss is always the least." "Stock cattle," said Mr. Bordley, "are *kept*, others are fattened. The feeding is different. Cattle kept need no kind of grain, nor even *hay*, unless to cows about calving time. Straw, with any juicy food, such as roots or *drank*,* abundantly suffice for keeping cattle in heart through the winter, provided they are sheltered from cold rains. Mr. Bakewell kept his fine cattle on straw and turnips through the winter. A *drank* for *keeping* cattle may be made thus: roots, chaff, or cut straw, and salt, boiled together with a good quantity of water ; the roots cut or mashed. The cattle drink the water and eat the rest Drank for *fattening* cattle thus: roots, meal, flax-seed, chaff, or cut straw, and salt, well boiled together in plenty of water. If given warm, not hot, the better." The same author says, "Hay, meal, and linseed jelly with drank must be excellent food in stall feeding. Linseed jelly is thus made: seven quarts of water to one of flax-seed, steeped in a part of the water forty-eight hours, then add the remaining water, cold, and boil it gently two hours, stirring constantly to prevent burning. It is cooled in tubs, and given mixed with any meal, bran, or cut chaff. Each bullock (large) has two quarts of *jelly* a day ; equal to a little more than *one quart of seed in four days.*"

In a tract entitled "Notices for a Young Farmer," written by the Hon. Judge Peters, formerly president of the Pennsylvania Agricultural Society, are the following directions:

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* The word *drank* is given us by Coun. Rumford for distinguishing this composition from water.

"Cut or chaff your hay, straw, corn tops, or blades, and even your stalks, with a straw cutter, and you will save a great proportion which is otherwise wasted or passed through the animal without contributing to its nourishment. One bushel of chaffed hay at a mess, given in a trough, three times in twenty-four hours, is sufficient for a horse, ox, or cow. A bushel of chaffed hay, lightly pressed, weighs from five to five and a half pounds. A horse or horned beast thrives more on fifteen pounds thus given than on twenty-four or twenty-five pounds as commonly expended (including waste) in the usual manner of feeding in racks; to which troughs, properly constructed, are far preferable.* Salt your clover and other succulent, as well as coarse hay. But over-salting diminishes the nutriment. More than a peck to a ton is superfluous. Half that quantity is often sufficient. Ten or fifteen pounds is usually an ample allowance. Feeding your stock by weight and measure of food will not only save your provender, by its orderly distribution, but frequently save the lives of animals, too often starved by niggardliness or neglect, or gorged and destroyed by profusion. If it be true, as it is, that the master's eye makes the horse fat, it is equally so, that the master's eye prevents the horse from being pampered, wanton, pursive, bloated, foundered, and finally wind-broken and blind."

If hay is salted by using salt in substance, it should be done at the time it is deposited in the mow. It is often a good practice to sprinkle a solution of salt in water over hay or other food for cattle in the winter time, especially if the fodder be of an inferior quality.

Colonel Jaques, of Ten Hills farm, Charlestown, (Mass.) has been very successful in the breeding and rearing of neat cattle, and recommends from actual experiment the following mixture:

Take Ruta Baga, cut fine,	2 bushels.
" Wheat bran,	1 bushel.
" Powdered oil cake,	½ bushel.
" English hay, barley straw, and salt hay, *cut*, of each,	7 bushels.
" Water,	10 gallons.

Let them be perfectly mixed. Give a bushel of the mixture to a cow of the common size every night and morning, and proportionably to greater or smaller animals.

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* See further, *Straw Cutter*, under the head *Agricultural Implements*.

On soiling laboring Oxen and Horses. By *soiling* domestic animals, is meant keeping them in yards, &c., and cutting and giving them grass, with or without other green or dry food. Instead of turning your oxen and horses, which you have occasion to use frequently, into a pasture, perhaps adorned with thickets of brushwood, in which the animals may hide themselves beyond the reach of a search warrant, you had better *soil them*, and thus have them always at hand. You must be careful that they are always well supplied with water, and plenty of litter to absorb the liquid manure, unless you have reservoirs, &c. to answer the purpose of preventing its waste. The famous cultivator Arthur Young, observed, that lucerne is the best plant for soiling, and an acre of it will go farther than any thing else But clover or any other grass, green or dry, butts of Indian corn cut up near the roots, cabbages, &c., &c., may often be economically disposed of in soiling cattle or horses, whose services are requisite for the daily and hourly labors of the husbandman. But soiling on a large or general plan will not soon, if ever, be adopted in New England, where there are so many thousands of acres of pasture land which are fit for nothing but grazing.

Cooking Food for Cattle. Among the most useful improvements of modern husbandry, may be numbered the practice of steaming or boiling food for domestic animals Some account of the origin of this practice in Great Britain may be found in "The Complete Grazier," an English work of reputation, from which we have made the following extracts.

"Steamed food may be given to milch cows to great advantage. For this important fact in rural economy, we are indebted to the ingenious and persevering experiments of J C. Curwin, Esq., M. P., whose attention to the comforts of his tenants, and judicious zeal for the improvement of agriculture, are too well known to require any eulogy. In prosecution of a system which he had long practised of giving cooked food to animals, Mr. Curwin turned his attention to the cheapest mode of supplying milch cows with it; and in a communication to the Society for the Encouragement of Arts, &c., (which was honored with their less gold medal,) he stated his belief that he has at length been completely successful. He uses a steam boiler of 100 gallons' contents,* on each side of which are fixed three boxes, containing eleven stones* each of chaff, (the husks of wheat, rye, &c.,) which by being steamed gain more than one third of their original weight. The steam is conveyed by various cocks into the lower part of the boxes; and thus two or three boxes may be steamed at the same time. The quantity of fuel required was about two pounds for each stone of chaff.

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* An engraving of . is given in the thirtieth volume of the Society's Transactions.

"In giving the steamed chaff to the cattle, two pounds of oil cake were mixed with one stone of chaff; and the milch cows are fed with it morning and evening, having an allowance of one stone at each time. On being taken from the steamer the food is put into wooden boxes, which are mounted on wheels, to be drawn to the place where it is intended to be used; and the chaff requires to stand some time before it is fit for use.

"The average milk on a stock of thirty-six milch cows was nearly thirteen wine quarts for 320 days. The cows were never suffered to be turned out; and to prevent their being lame, their hoofs were properly pared, and they stood with their fore feet on clay. One great advantage attending this method was, that most if not all the milch cows were in such a condition, that with a few weeks' feeding, after they were dry, they became fit for the shambles, with very little loss from the first cost. As a substitute for chaff and oil cake, Mr. Curwin recommends cut hay; which, when steamed, would make very superior food, and he entertains no doubt would greatly augment the milk as well as the health of the animals."

An apparatus for steaming food for cattle should be considered a necessary appendage of every arable and dairy farm of a moderate size. The advantage of preparing different sorts of roots, as well as even grain, chaff, and hay, by means of steaming apparatus, for the nourishment of cattle, begins now to be generally understood. It has been long known that many sorts of roots, and particularly the potato, become much more valuable by undergoing this sort of preparation. And it is equally well known, that when thus prepared, they have been employed alone as a substitute for grain, with cut chaff for hay and grain, in the feeding of horses as well as other animals. To a farmer who keeps horses or cattle, or even swine or poultry, the practice of boiling their food in steam is so great a saving and advantage, that it deserves the most particular attention. Though potatoes have often been given raw both to horses and cattle, they are found to be greatly preferable when cooked by steam, as they are thereby rendered much drier and more nutritive, and better than when boiled in water; this has been long since shown by the experiments of Wakefield, of Liverpool, who, in order to ascertain it, fed some of his horses on steamed and some on raw potatoes, and soon found the horses fed on the steamed potatoes had greatly the advantage in every respect. Those fed on steamed potatoes looked perfectly smooth and sleek, while the others were quite rough.

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* Fourteen pounds a stone

A steaming machine on a simple and economical plan consists of a boiler, and a wooden chest or box, placed over or near it. The box may be of any size, and so placed as to be supplied and emptied by wheel or hand-barrows in the easiest manner, either by the end or top, or both, being made to open. If the box is made eight feet by five, and three feet deep, it will hold as many potatoes as will feed fifty cows for twenty-four hours, and these may be steamed in an hour.*

The practice of cooking food for cattle is by no means a novelty in New England. A simple apparatus for this purpose much used is as follows:

A kettle, holding twelve gallons or more, is set in a furnace of brick or stone, and over this a hogshead with one head taken out and the other bored full of holes. This is set so close that the steam of the kettle, when boiling, can only rise through the holes, and thence ascend among the articles to be boiled in the hogshead, and pass off at the top. In this way a hogshead of potatoes will be nearly as soon boiled as a small part of them could be if placed in the kettle underneath.

As the kettle is so closed as to prevent any steam from passing off but through the bottom of the hogshead, a pipe or tube is set in such a manner that with the aid of a funnel water may be poured into the kettle as often as is necessary. After the water is poured in, the tube is stopped with a plug for that purpose.

Grain of all kinds may be steam-boiled to great advantage for feeding and fattening cattle; but in that case it is requisite to have the bottom of the hogshead covered with a cloth, to prevent the grain from running down through the holes.

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* For a simple apparatus for steaming food for cattle and swine, see a cut under the head *Agricultural Implements*.

In the fifth volume of "The New England Farmer," (p. 306,) are some notices of the use made of steam in preparing food for cattle, in a letter from R. Smith, Esq., President of the Maryland Agricultural Society, on the management of dairy cattle, &c., to John Hare Powel, Esq.

"For the purpose of augmenting the quantity and improving the quality of the food of my stock of every kind, I have established a steaming apparatus. It consists of a boiler and two wooden boxes, in which boxes is steamed the food. These boxes contain each eighty bushels. By this simple apparatus, every species of coarse vegetable offal is converted into nourishing food, and all the ordinary provender is rendered more nutritious.

"In the dairies near Philadelphia, it is well known, that sweet butter of the first quality cannot be made but from cream *quickly* produced from *fresh* milk, and that whenever the milk remains many days to produce its cream, such cream acquires an unpleasant taste that is imparted to the butter.

"Since the month of January, 1823, my dairy people have been in the practice of always placing the pans containing the milk in water simmering hot. The oily parts which constitute the cream are by such heat separated from the other ingredients, and then, from their specific lightness, they of course ascend to the top in the form of cream. Cream is thus obtained during the coldest weather in winter in the course of about twelve hours after the milk has been taken from the cows. And the operation of churning such cream never exceeds twenty-five minutes. The milk pans remain in the hot water about thirty minutes. The butter has invariably been of a fine flavor, and of a beautiful yellow color; and, in the nature of things, it never can be otherwise, unless the dairy woman should be utterly ignorant of the art of making sweet butter.

"It may not be amiss to state to you, that the skim-milk under this process is a very pleasant beverage. In summer and winter it bears the agitation of a carriage without becoming sour. And every morning through the year a person comes to the farm and takes from 250 to 300 quarts, for which he pays two cents per quart, cash, and on the same hay he retails the whole among the people of the town, at three cents per quart.

"The hot water in which the milk pans are placed is contained in large flat wooden vessels, attached to a stove. The water is heated by means of a flat tube fastened to the side and near to the bottom of each vessel, and introduced through an aperture into the stove. The heat of the stove affords the additional advantage of preserving in the dairy house the requisite temperature during the winter season.

"The dairy house is a stone building, consisting of three spacious apartments for the preservation of the milk, the cream, and the butter, and for the making of the butter. Two of these apartments are under ground and arched, and properly ventilated. To the south side is attached a convenient shed, with the requisite shelves, and with a copper boiler for washing and keeping in good and sweet condition all the dairy utensils. In front is a pent house."

Jesse Buel, Esq., recommends using a boiler instead of a wooden vessel for cooking food for swine. He observes, "I have thrown by my steamer for hog food and substituted a boiler. The former consisted of a sixty gallon cask, over a potash kettle badly set. I could only work off four or five casks a day, with great labor and trouble, and the apparatus required to be luted with clay at every operation. With my new kettle, holding thirty gallons, which is a thin and beautiful casting, I have cooked eight and nine barrels in half a day, and much better than by the steam process. This food consists of small refuse potatoes, of which I have nearly 100 bushels, or fifteen per cent. of my whole crop, pumpkins, and a small quantity of Indian meal. A half day's boiling serves my hog family for four or five days; and it is always kept prepared in advance. The actual expense of fattening hogs thus, upon the refuse of the farm crop, is fifty to seventy-five per cent. less than feeding with dry corn.

"The economy of my apparatus consists much in setting the boiler so as to have all the advantage of the fire. The interior brick work is made to conform to the shape of the boiler, leaving an interval of four to six inches between them for the fire, round the whole exterior of the kettle, with the exception of a few inches at top, where the flange or rim rests upon the projecting bricks. Thus the boiler is not only encompassed by the flame, but the heat is augmented by radiation from the brick work. The fuel is burnt on a grate, which extends nearly to the kettle, four or five inches above the level of its bottom. My boiler being in operation while I am preparing these remarks, I have ascertained, that a kettle of potatoes with three pails of cold water, covered with boards, has been completely boiled in eighteen minutes from the time they were put in, another boiling having been just previously taken out. My kettle was set by a son in his teens, without assistance, and was his first effort in masonry."

In cooking for cattle, however, when hay and other bulky articles of food are prepared by heat, steam will be found the best medium Care should be taken to make the vessel in which the steaming is effected so tight that the steam cannot escape till it becomes quite hot and elastic. A cover of good weight sitting close, but capable of being raised a little by steam of high pressure, may be made to operate like a safety valve, and at the same time confine the steam till it exceeds ?12 degrees, the heat of boiling water. Any food is better when cooked by steam of a high temperature, than when merely soaked in an artificial fog, not much warmer than a mist which caps the hills on a summer's morning.

CALVES. *Calves* designed for veal should be taken from the cow the next day after they are calved. They should be permitted to suck only two teats during the first week, three during the second, and should have the whole of the milk the third and fourth week, at the end of which time they will be fit to kill. The teats not allowed to be sucked should be previously milked.

When calves are to be reared, some permit them to run with the cow, and take all the milk the first season. But fine animals are raised without taking any milk from the cow after three or four days. They should have more or less milk for about twelve weeks. They may be fed with skimmed milk or water gruel after the first fortnight ; or hay tea may be mixed with their milk, or their milk may be mixed with meal and water. After a calf has sucked or drank milk for the space of a month, take some fresh and sweet hay, and put small locks of it into cleft sticks, in such a manner that the calf can easily have access to them, and he will soon learn to eat hay.

Whether calves are intended to be fattened or to be reared, it is best to feed them three times a day. But whether they are fed two or three times, the intervals between their meals should be regular, and as nearly as possible equi-distant.

The method for rearing calves pursued by Mr. Crook, as mentioned in "The Letters and Papers of the Bath and West of England Society," is as follows: He purchased three sacks of linseed, value 2*l.* 2*s.*, (equal to about nine dollars,) which lasted him three years. One quart of seed was boiled in six quarts of water for ten minutes, to a jelly, which was given to the calves three times a day mixed with a little hay tea. And he states, that his calves throve much better than those of his neighbours, which were fed with milk. Thus it seems, that less than eighteen cents' worth of flax-seed, with a trifle of hay, is sufficient for one calf. Linseed oil cakes, when pulverized and boiled, make an equally good broth or jelly.

If skim-milk is given to calves it should be boiled, and suffered to stand till it cools to the temperature of that first given by the cow. It is better boiled than when warmed only. If the milk be given too cold it will cause the calf to purge. If this is the case, put two or three spoonfuls of runnet into the milk, and it will stop the looseness. If the calf is bound, pork broth is said to be a good and safe thing to put into the milk.

Dr. Deane was of opinion, that it was better to wean calves on hay than on grass. "They are more docile when raised in the barn, and thrive better." A Mr. John Gordon says, that "calves should not be suffered to eat any grass the first year, and from experience I find it much the cheapest to keep them shut up and feed them, as the land sufficient to pasture one will produce hay enough to feed two calves through the year, and pay the expense of cultivation, and one year's growth will certainly be added to the cattle."*

It is not probable, however, that many of our farmers will incur the trouble of raising calves in a barn; therefore, "when calves are put in a pasture, it should be such as is dry and sweet. White clover is the best for them; red clover or trefoil is also good. Mr. L. Hommedieu recommends that there be no water in the pasture, but sufficient shade. The effect of this is, that the calves learn to feed at night, or when the dew is on, and lie by in the day; and as the grass while wet with dew is believed to be most nourishing, they will in this way thrive much better than those which have free access to water; for this, it is contended by Mr. L. Hommedieu, has a tendency to stunt them, and make them pot-bellied. Probably the better way is, to give them a little nourishing drink at certain times, when the dews fail, or at mid-day, when the weather is very warm." *

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* Massachusetts Agricultural Reports, Vol. V. p. 78.

The best calves for bringing up, are those calved early in the season, or before June. "When calves are weaned, they should not be suffered to be with their dams any more till fall; neither should they be pastured within sight or hearing of them. It will cause them to neglect their feeding; and they will not forget their sucking.

"At the setting in of cold nights in autumn, calves must be nightly housed; and not be out early in the morning, nor late in the evening. And as the pinching cold of winter will be extremely detrimental to them, they should be kept very warm in their house, well supplied with water, and let out only on the warmest days. A great deal of care is necessary to bring them through the first winter, which is the most dangerous period of their lives. They will acquire so much strength during the following summer that they will have nothing to fear from the cold of a second winter." —*Buffon, Histoire Naturelle.*

"The American Farmer" gives the following method of making *hay tea* for calves. Take about a pound of red clover hay, well got in, and six quarts of clear spring water; boil them together till the water is reduced to four quarts; then take out the hay and mix a pound of barley, oat, bean, [or Indian] meal amongst a little water, put it in the pot or cauldron while boiling, and keep it constantly stirring until it is thickened. Let it cool, then give it to the calf, adding as much whey as will make a sufficient meal.

To make calves lie quiet, more especially during a temporary scarcity of milk, balls made of wheat flour, and a sufficient quantity of gin to form it into a paste, are recommended by Mr. Marshall; three balls about the size of walnuts to be given about a quarter of an hour before each meal The effect is, that instead of wasting themselves by incessant "bawling," they lie quiet, sleeping a principal part of the time. Probably, Indian or rye meal, mixed up with gin, whiskey, or other cheap spirit, might answer a good purpose as an occasional expedient. We should not advise, however to often diet calves in that manner, unless they were intended for the butcher; for we should be apprehensive that feeding them with such nice messes would render them too delicate and *mealy mouthed* to become hardy and profitable cattle. Young advises, when calves are troubled with scouring, to give them powdered chalk and wheat meal, worked into a ball with gin.

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* Farmer's Assistant.

The following is the mode of rearing calves adopted by the Shakers, in Canterbury, N. H., communicated in a letter from Mr. Francis Winkley to Mr. Levi Bartlett, of Warren, New Hampshire, and published in "The New England Farmer," (Vol. II. p. 305.)

"We let calves that come in the fore part of March suck about a week or ten days, then take them from the cow, giving them a moderate allowance of new milk to drink, till they have learned to drink it freely; then put in some skimmed milk; and we feed them wholly with skimmed milk, taking care to give it at about the temperature of milk taken directly from the cow, by heating a part of it and mixing it with the rest. Care should be taken not to scald the milk when heated; also not to give them any sour milk, for this will make them scour. The trough or vessel in which they drink their milk should likewise be kept clean, and not suffered to become sour.

"We let the milk stand about twelve hours before it is skimmed; giving a calf at first about four quarts night and morning; increasing the mess as need requires till he is six weeks old, from which time till ten weeks old he will require, perhaps, about twelve quarts per day.

"When about ten weeks old, we begin to diminish the quantity of milk for about the space of two or three weeks, at which time we wean them. During the whole process from two to fourteen weeks of age, calves should be well supplied with good hay, salt, and provender; such as oats, wheat bran, and oil cake, ground fine.

"The particular advantages to be derived from the above method of treatment are the following:

"1. It is much cheaper than to let them suck in the ordinary way; whereas it makes a great saving of cream for butter, and that without injuring the calves, if they are properly attended to.

"2. It prevents calves from moaning or pining so much while weaning, as they would otherwise do, when taken from the cows

"3. It not only prevents the cows being injured in consequence of the calves biting the teats, but also prevents their holding back the milk from the milker, which often serves to diminish the quantity of milk afterwards.

"The only disadvantage to be found in the above method of treatment is, that it requires some more labor to feed them, where they thrive equally well in every respect as those do which are permitted to suck in the ordinary way."

The following is from "The United States Gazette."

"Among the modern improvements in farming, the dairy has of late years been very much neglected. So much of the profit of breeders depending upon the facility with which the milk of the cow may be reserved during the sucking time of the calf, the following substitute, used in Germany, for the natural food of the young progeny, may be acceptable to our country readers.

"Let as much water be heated on the fire as the calf will be disposed to drink, and when it boils throw one or two handfuls of oat meal* into it, and after continuing in that state for one minute, take it off, and let it be cooled to the temperature of new milk, when one or two pints of skimmed milk are to be added to it.. With this beverage, the young animal will fatten and thrive prodigiously: the milk of the parent will be applied to the dairy, and the intelligent farmer will immediately discover the great advantage to be derived in the produce of the dairy from such an expedient."

Willich's "Encyclopedia" observes, "In order to make calves fine and fat, the best and most efficacious way is, to keep them as clean as possible, by elevating their coops in such a manner that the sun may not have too great power over them, and to such a height above the level of the ground that their urine may pass off; by giving them fresh litter every day, and suspending over the coop a large chalkstone, so that they can easily lick it. Besides this, it is usual to bleed them when they are about a month old, and again just before they are slaughtered; which practice tends in a considerable degree to the beauty and whiteness of the flesh, and is therefore more frequently repeated by some farmers; [in England;] but this is not altogether necessary; twice bleeding being fully sufficient for that purpose, in the opinion of the most experienced breeders. It is, however, to be observed, that those calves which are intended for bulls or for oxen should be selected as soon as possible; as the operation necessary to make them oxen should not be deferred till the calves are more than twenty days old.

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* Indian meal will do as well.

A writer for "The New England Farmer," with the signature S. X., (Vol. VIII. p. 76,) observes, that "A very intelligent practical farmer states, that he considers nothing more conducive to the thriving of sucking calves than to keep in their pen an ample supply of dry yellow loam, of which they are at liberty to eat freely as they choose. They will eat it eagerly, and he regards it of more value than Indian meal. There is no better evidence of its utility than the fact that no man's calves find a readier sale or bring a higher price in our market than his. The philosophy of it we do not pretend to explain."

Moubray says, "The calf may be sold (or taken from the cow) as soon as it has drawn the biestings or first milk, unless any *coring* or defect in the cow's udder or teats may render it desirable for the calf to suck a few days, in order that the action may clear off any obstructions, for which the butting of the calf's head is generally the best remedy. If intended to be fattened for the butcher, it must be kept in a pen particularly dry and clean; suckled twice a day at regular hours; always have the first, which is the thinnest of the milk, and not be permitted to overcharge its stomach. Lumps of soft chalk are usually placed for the calf to lick, as an absorbent to neutralize the acidities engendered in the stomach from feeding on milk. It seldom pays to fatten a calf beyond ten or twelve weeks.

"*Weaning and rearing Calves.* A calf may be weaned by being gradually accustomed to suck milk in a pail through the fingers. Many are reared on very little milk mixed with hay tea, linseed, or other slops; fed on straw in the winter, and in summer on the common: such cannot be expected to turn to much account. The best cattle are reared from the teats, well wintered in good shelter, and full fed until they attain their growth. Warmth and dry lodging are of the utmost consequence to the improvement of all young animals. Calves may, however, be reared to good profit, by being suffered to suck a very moderate quantity daily, the bulk of their food consisting of skimmed milk, thickened with oat or wheat meal; their winter food being carrots or Swedish turnips sliced, and cut straw, with a small quantity of hay, daily."

"The Grazier's Guide" observes, "If the calf be intended for the butcher, it may be taken from the cow in about a week or ten days, and fed the remainder of the time by hand; but the time of taking the calf away must be determined by the state of the cow's udder; for unless that be free from kernels and indurations, the calf must be allowed to suck, as the jolting of its head is the means of healing or restoring the udder, and preventing the downfall or inflammation in this part, which might cause much trouble, and even endanger the life of the cow.

"But if the calf is intended to be reared, it should not be weaned until at least six weeks or even two months old, whether male or female. For such, there is no food like the cow's milk; and if she does not yield a sufficient quantity, that of another ought to be had recourse to. It is an incontrovertible fact, that the longer a calf sucks, not only the larger and stronger will it become, but it will also acquire a much better form and more robust health."

Calves which come early should be preferred for the rearing. Those which come late, do not acquire sufficient strength to bear the cold of winter; they languish, and are reared with difficulty. Calves should not be weaned too suddenly, but by little and little. The less they are able to eat, the more they should be allowed to suck; after a while they may be brought to take it from the pail. This is done by placing the hand in the milk, with the palm upwards, and under the milk, while the fingers are raised above the surface of the milk for the calf to lay hold of with its mouth, which it does very readily, and sucks up the milk with great ease.

When they are completely taken away, they should be fed with a little bran, and some of the best soft and fragrant hay of the second crop ; they should be allowed plenty of the skimmed milk, and now and then a little water in which barley has been boiled and broken up, or a little buttermilk occasionally. There is at first some difficulty in bringing them to drink, but a little perseverance will accustom them to it.

Moderate warmth and *dry lodging* are of the utmost consequence to young calves ; and if we would turn them to any good account, they must not be stinted either in these or in their food. Calves which have recently been weaned and are not at pasture should be fed often, at least three times, and it is bette- five times a day As soon as they are fit to follow the mother they should be let out, as they are greatly benefited by air and exercise. Calves sometimes acquire a habit of sucking one another, of which trick they may be broken by separating them.

Calves cannot be kept too clean, nor have fresh litter too often. If they are suffered to lie on their own dung and urine, they will become mangy, and scarcely ever thrive. They are subject to several disorders, such as diarrhœa, dysentery, costiveness, &c. As a means of preventing the greater number of the diseases to which they are liable, the following rules are prescribed in "The Farmer's and Grazier's Guide."

"1st. Let the young calf suck the first milk. This will cleanse its bowels, and prevent costiveness.

"2d. Let it suck from its mother at least two months, and then wean it gradually.

"3d. Let its first food be such as is easy of digestion, and let it have plenty of sweet skimmed milk and good hay.

"4th. Keep it very clean, well rubbing it occasionally with a wisp of hay or straw.

"5th. Keep its stable clean, and perfectly free from all impurities.

"6th. Let it have gentle exercise; the best will be following the mother in the meadow or pasture.

7th. Do not stint it either in good food or good drink, and change its litter often enough to keep it clean, sweet, and dry."

OXEN. Till oxen are four years old they are usually called steers; afterwards oxen. The signs of a good ox, according to Dr. Deane, are these: thick, soft, smooth, and short hair; a short and thick head; glossy, smooth horns; large and shaggy ears; wide forehead; full, black eyes; wide nostrils; black lips; a thick fleshy neck and large shoulders; broad reins; a large belly; thick rump and thighs; a straight back; a long tail, well covered with hair; short and broad hoofs. The best colors are brown, dark red, and brindled. When an ox has completed his eighth year he should be fattened.

If oxen are worked in the yoke in wet weather, their necks are apt to become sore. To prevent this, a little tallow should be rubbed on the parts of the yoke which lie upon heir necks, and also on the bows.

The following remarks on the management of working oxen, are from "The New England Farmer," Vol. VI. p. 191.

"Do not retard the growth of your beasts of draught, endanger their health, and render them insignificant in the eyes of many, by working them hard while young. But the younger they are inured to light work, the more docile they will generally become

"An English writer recommends carding oxen, and says 'the ox, after the sensation becomes familiar, receives pleasure from the operation, and will momentarily forego his meal to receive the full enjoyment. His feeder perceives this, and brushes the part which gives the most pleasure. The ox shows his gratitude by wagging his tail; the feeder in return calls him by name, and ingratiates himself with him. Thus not only an intimacy but a mutual affection is formed, which at once gives attention to the keeper and docility to the ox, and renders the labors of both pleasant.'

"Their labor and their fodder ought to be proportioned, that their health and their spirits may be kept in full tone. Their coats ought to be sleek; their hides loose and silky; the flank should fill the hand, and the shoulder handle mellow. If they be overworked or underfed, sluggishness and disease will inevitably follow. A working ox ought always to *be beef*, that in case of accident he may be fit for the table."

The common mode of working oxen by a yoke, has been condemned by many agricultural writers. Mr. Cooper, an Englishman, according to Young's "Eastern Tour," used collars on oxen as on horses, except that they were buckled on with the narrow and open end downward. They draw in harness abreast, in pairs, single, or in a line, *and walk as fast as horses*. Mr. Bordley said, he "saw a wagon in Pennsylvania drawn by two bulls and two oxen, bridled and geered in harness and collars."

It appears, by a work entitled "Letters from Cuba," by Dr. Abiel Abbot, that in managing the oxen of that island, the yoke is made fast to the horns, "near the root, behind, so that it does not play backward and forward, and gives to the oxen a similar but *better* chance of backing, (as, in teamster's phrase, it is called.) I have been astonished at the power of those oxen in holding back. There is a short hill in one of the streets of this city, at an angle nearly of forty-five degrees. Standing at the foot of it, I saw a cart and oxen approaching at the top, with three hogsheads of molasses, and the driver sitting on the forward cask. The driver did not so much as leave his perch; the oxen went straight and fearlessly over the pitch of the hill, and it seemed as if they must be crushed to death. The animals squatted like a dog, and rather slid than walked to the bottom of the hill. Have we any animals that could have done it? And if they could, have we any docile enough to have done it with the driver in the cart? Thus superior is this mode of yoking in holding back the load in difficult places.

"It gives them still more decisive advantage in drawing. A fillet of canvas is laid on the front below the horns; and over this fillet the cords pass, and the animal presses against the most invulnerable part of his frame; his head, his neck, his whole frame are exerted in the very manner in which he exerts his mighty strength in combat. It is the *natural* way, therefore, of availing yourself of this powerful and patient animal to the best advantage."

A writer for "The Genesee Farmer" observes, that "the frequent abuse of our laboring animals by those who receive the benefits of their labors, and who ought in return to treat them mercifully, has often given me great pain. I have employed in the course of my business a great many men and teams, both with oxen and horses, and I never yet knew a bawling, noisy, whipping teamster who did a great day's work; nor have I scarcely known such a one who kept a fat team. The best man who ever did me any labor was a good substantial farmer; his oxen were always fat, and spry as colts; he would never hitch them to any thing which he knew they could not draw; of course they were not discouraged; and he hardly ever spoke to them louder than in a low tone of common conversation. He would frequently talk to them soothingly, and encourage them when he had a hard job on hand, which was often the case. After making a heavy pull he would sometimes pat them on the back, but I rarely ever knew him to strike or worry his team. He carried a slender goad with a short lash to guide them with, and a mere swing of the whip was sufficient for his purposes. I have known several such persons in my life, and I do not hesitate to say, that any person who so manages his team will get more labor at less expense, and with more ease to himself, than by the ordinary bawling, whipping method so much practised in our country. All the difference with these people is, that the one understands and studies the nature and disposition of his animals, and the other does not. 'An even temper and a steady hand,' ought to be the teamster's motto, the world over."

The following valuable observations on the subject of breaking steers and colts, are extracted from a communication written for "The New England Farmer," by Mr. James Walker, of Fryeburgh, Maine, and published in that paper, Volume XII. p. 113.

"I call my young cattle calves till they are one year old. I have a little yoke made with a staple and ring in it. I tell my little boys to yoke up their calves: a small boy can do it, and it is quite a pastime to them; they being so young, are not so strong but that he can manage them with ease; any small stick or twig answers to drive them with, and there is no danger of the boy or steers being hurt. When he can drive them where he wishes them to go, which will soon be the case, he will hitch them to a small piece of wood, or if in winter put them to a hand sled, and drive round with that; they will soon become docile. There is no trouble with them afterward, especially if they are yoked a few times the second winter; it makes them fond of their mates. Oxen that are trained when young are much more pliable and obedient, which adds much to their value: steers that run till they are three or four years old are dangerous animals to encounter with; they are always running away with the cart or sled whenever there is a chance for them, and often serious injury is the result. I would not recommend working steers hard while young, as it would prevent their growth; there is a difference between working them and barely training them.

"Colts I begin with very soon after they are foaled; the mare should be bridled and led to the door, and given a little salt. When the colt is one or two days old, take him by the neck, handle him gently; he is then so young that he is not afraid, if his dam is near by him; continue this practice, and he will very soon become fond of his owner, and will come on purpose to be handled, after two or three weeks. It does not hurt the mare or the colt to use her moderately If you want to go to meeting on the Sabbath, harness the mare into the chaise or wagon, and tie the colt to the arm of the carriage; he may be a little obstinate at first, but in going a few rods will be peaceable and very orderly; if there are many other horses about, your colt is always with you: if you want to stop at a place any time, let your colt loose;

he can be taken again without difficulty, and before you start off tie your colt again; in this way there is no trouble of the colt following other horses away. When they become old enough for service, you do not have to run all over the pasture for the horses; they can always be taken with ease. Colts trained in this way are completely halter broken. When you begin to harness them, they are not frightened at the noise of the carriage behind them, and are sooner made quiet in the harness. It has been a common saying, that if colts are handled when they are young, it depresses their courage, which I am convinced is not the fact. I have raised as many horses as most farmers of my age in this vicinity, and some of them the most spirited I ever saw. The above rules I have practised for quite a number of years, and can recommend them to others with confidence."

On training Oxen to back a Cart. A writer for "The Maine Farmer," with the signature of "A Teamster," states as follows:

"I have observed that very little if any attention is paid by our farmers to learn their steers to back; but as they become able to draw a very considerable load forward, they are often unmercifully beaten on the head and face because they will not back a cart or sled with as large a load as they can draw forwards, forgetting that much pains have been taken to learn them to draw well forward, but none to learn them to push backward. To remedy the occasion of this thumping, and the delay, which is always disagreeable, as soon as I have learned my steers to be handy, as it is called, and to draw forward, I place them on a cart where the land is descending in a small degree. In this situation they will soon learn with ease to back it; then I place them on level land, and exercise them there; then I learn them to back a cart up land a little rising: the cart having no load in it thus far. When I have learned them to stand up to the tongue as they ought and back an empty cart, I next either put a small weight in the cart, or take them where the land rises faster, which answers the same purpose. Thus in a few days they can be learned to back well, and know how to do it, which by a little use afterwards they will never forget. This may appear of little consequence to some, but when it is remembered how frequently we want to back a load when we are at work with our cattle, and how commodious it often is to have our cattle back well, why should we not learn them for the time when we want them thus to lay out their strength? Besides, it saves the blows and vexation often encountered, which is considerable when one is in haste. It is a merciful course towards our brutes. I never consider a pair of oxen well broke until they will back with ease any reasonable load, and I would give a very considerable sum more for a yoke of oxen thus tutored than for a yoke not thus trained."

Oxen sometimes contract a bad habit of pulling or hauling against each other; and sometimes crowd each other, so as to render them almost entirely useless as laborers. It is said that by turning them out to feed in the yoke they will learn to move in concert, and thus be broken of the habits of pulling and crowding.

In the "Transactions of the Society of Arts," the following mode of training oxen to the draught is recommended: "Put a broad strap round their necks, fasten one end to a large log of wood; permit the ox to drag it about as he feeds in his pasture, before he is put in harness, by which his docility is much forwarded." If a yoke of oxen were fastened to a heavy loaded sled or drag, placed in a pasture, and the oxen secured in such a manner that they could not cast or injure themselves, and the load were so heavy that they must act in concert to move it, they would soon learn to pull together, and be true to the yoke. Having eaten the grass within reach of their first location, they would of necessity unite their efforts to remove their load to a fresh spot, and would adopt for their motto, *united* we *feed*, *divided* we *starve*.

Diseases of Cattle. Our limits will not admit of our being very copious under this head; but some of the most common ails to which cattle are subject shall be briefly treated of, and the remedies prescribed.

Cattle are apt to be *hoven* or *swollen*; in consequence of having eaten too much green succulent food. The common remedy for this disorder has been, to stab the infected animal with a penknife or other sharp instrument under the short ribs, and put into the orifice a tube of ivory, elder, a quill, or something of the kind, to give vent to the confined air The wound is then dressed with some sort of adhesive plaster, such as Burgundy pitch, and thus in general the cure is effected. This, however, according to "The Grazier's Guide," is a bad practice; a second attack becomes more difficult to cure, as the wound adheres to the side, and every repetition increases the danger.

The thirty-third volume of Young's "Annals of Agriculture," prescribes the following recipe for hoven cattle, which it states will effect a cure in the most desperate cases in half an hour. Take three quarters of a pint of olive oil, one pint of melted butter or hog's lard; give this mixture by means of a horn or bottle, and if it does not produce a favorable change in a quarter of an hour, repeat the same quantity, and walk the animal gently about. For sheep attacked with this malady, the dose is from a wine-glass and a half to two wine-glasses.

The following remedy for this complaint has also been recommended. Make about a pint of lye, either with hot embers thrown into a sufficient quantity of water, or by dissolving therein about an ounce of pot or pearl-ash, and turn it down the throat of the ox or cow affected. A proportionably less quantity will answer for a sheep. This is said to give immediate relief, by neutralizing the carbonic acid gas in the stomach of the animal, which causes the swelling and other symptoms of the complaint to subside.

Besides these remedies, flexible tubes and canes, with knobs on their ends, tarred rope, whip handles, &c., have been used to force a passage from the mouth to the stomach, to let the confined air escape upwards from the trunk of the animal affected. Descriptions of some of these instruments may be seen in "The Domestic Encyclopedia," (Vol. I. pp. 409, 410.) Loudon likewise observes, that "the flexible tube for the relief of cattle that are hoven or choked, consists of a strong leathern tube, about four feet long and half an inch diameter, with a leaden nozzle, pierced with holes at the insertion end. It should be kept in every farmery. There is a similar one, on a smaller scale, which should be kept by every shepherd."

In turning cattle or sheep into fresh and rank clover or lucerne, care should be taken at first to let them remain but a short time when the grass is dry, and then turn them out again, that they may by degrees become accustomed to the rich herbage.

Hoof-ail, or Hoof Distemper. A writer for "The Massachusetts Agricultural Repository," (Vol. IV. p. 339,) gives some account of this disorder, from which we extract the following.

"*Symptoms.* When an animal is at all lame, its foot should be carefully felt. The first indication is, usually, an uncommon degree of warmth, and a soft and puffed feel of the parts immediately connected with the slit between the hoof, either before or behind the foot, and generally just above it. If in the hind foot, and not easily handled, a fulness may generally be perceived, by standing behind the animal, and carefully comparing the appearance of the two feet between the dew-claws and the hoofs, (for it very rarely commences its attack on more than one foot.) In the fore foot it generally swells forward; and in taking up the foot the slit between the hoofs will generally have the appearance of dryness, easily distinguishable to a person used to cattle, and the animal frequently licks the front part of the foot. Instances frequently occur of sudden and extreme lameness, without any appearance of heat or swelling in the foot; and these are often the worst cases; but one symptom rarely fails to accompany the disease, which is extreme restlessness and appearance of anguish, attended with loss of appetite and flesh, but without in the least affecting the brightness of the eye, and, perhaps, sometimes unnaturally increasing it; but the eye has a peculiar cast. As a general rule, it is safest to attribute all lameness of the foot which cannot be traced to a sufficient cause, to the hoof-ail. Lameness of the foot can generally be distinguished from that of the leg, hip, or shoulder, by making the animal step over a stick or rail, and carefully watching its motions.

"*Remedies*. The foot should be carefully washed and cleansed, and thoroughly examined, to be sure that the lameness does not arise from a nail casually run into the foot, or a prick in shoeing, from a wound from a stump or other substance between the hoofs, (a case frequently occurring.) If no appearance occurs of any break in the skin, while the foot is still wet, apply as near as may be to the centre of the slit between the hoofs, from one to three grains of corrosive sublimate, (reduced to a fine powder,) the dose to be proportioned to the size of the animal and the violence of the attack. Care must be used that the powder is put completely in this slit, for it is a very strong poison, and the animal, as soon as at liberty, will begin to lick the foot if a sore one. The moisture left by the washing makes the powder adhere, and the effect is produced in a very short time. Some prefer mixing the powder with hog's lard, which answers; but is thought less powerful: it has one advantage, however, as being less dangerous to keep in a house, (for no one takes salve inwardly.) Where corrosive sublimate cannot be obtained, any other violent stimulant may be applied. Common salt is often effectual in very slight attacks; but it is of the greatest importance to lose no time. The application is to be repeated every twenty-four hours till a cure is effected, or till the foot shows unequivocal signs of a gathering which will break."

Loss of the Cud. Rumination, or the chewing of the cud, is that motion of the rumex or first stomach by which the food is forced back into the mouth to be perfectly masticated This motion is not sudden or violent, like that of vomiting; but gradual and gentle, when the animal is healthy. When, therefore, an animal ceases to perform this essential act of digestion, it is an evident proof that the stomach is out of order; it may depend on the state of the first stomach, or it may proceed from the third.

Loudon asserts, that although "loss of the cud enters into the list of most of cow leeches' diseases, it is less a disease than a symptom of some other affection; indeed it is evident that any attack sufficient to destroy the appetite will, generally, occasion the loss of the cud. It is possible, however, that an occasional local affection, or paralysis of the paunch, may occur, particularly when it is distended with unhealthy substances, as acorns, crab-apples, the tops of some of the woody shrubs, &c. The *treatment* in such cases, consists in stimulating the stomach by tonics, aloes, pepper, and gin, mixed. Though these as liquids may not enter the stomach in common cases, yet in this disease or impaired action of the rumex they will enter there."

Mr. Lawrence, an English writer, says, in loss of cud, "Let the animal fast some time, then give a warm bran or pollard mash, with good hay and warm water with salt. This treatment alone may succeed with patience, even should the maw be obstructed with acorns or crab-apples. An aloes' tincture made with brandy and ginger, or capsicum [red pepper], might be of use in this case. After conquering the obstruction, bitter infusions made of camomile, hoarhound, oak bark. &c. in beer may be required, as restoratives, although, perhaps, good dry nourishing food will have an equally good effect."

Horn-ail, or Horn Distemper. In the spring, cattle which have been poorly kept through the winter, are subject to a wasting of the pith of the horn, which is usually called the *horn distemper.* It is sometimes in one horn only and sometimes in both. The indications of the disease are, coldness of the horn, dulness of the eyes, sluggishness, want of appetite, and a disposition to lie down. When the brain is affected, the animal will toss its head, groan, and exhibit indications of great pain.

To cure the disease, Dr. Deane directed to bore a hole with a nail gimblet into the lower part of the horn, through which the foul matter may be discharged. By this boring, which should be nearly horizontal, or in the depending part of the horn, and two or three inches from the head of the animal, the cure is sometimes completed. When it proves otherwise, a mixture of rum and honey with myrrh and aloes should be thrown into the horn, with a syringe, and be several times repeated if the disease continue.

Lovett Peters, Esq. of Westborough, Massachusetts, in a communication published in "The New England Farmer," (Vol. VII. p. 194,) gives the following recipe for curing this disease, which he observes was furnished him by an aged friend, and successfully applied to "a cow taken with horn-ail to that degree that she had nearly stopped eating, and from giving a large quantity of milk had become nearly dry."

"Take of salt one half-pint, of soot one half-pint, of black pepper one table-spoonful; make all fine, and give one or two spoonfuls at a time, night and morning. It is easily done, by drawing the tongue out of the mouth with the hand, and putting the spoon as far down as it will reach; then let go the tongue, and keep up the nose, and it will all go down." Mr. Peters says, "I followed the directions, and in two days my cow was better; and in a week was perfectly well. The same may not cure in all cases of horn-ail, as my informant said it would, but it is worth a trial."

It should seem, however, as Mr. Peters suggested, that the above-mentioned remedy is not infallible. Mr. Thomas Hazen, in a communication published in "The New England Farmer," (Vol. VII. p. 234,) states, that he tried it without success; but by the advice of a large owner of cattle, he freely applied spirits of turpentine to an ox in high flesh, but afflicted with the horn-ail, on the top of the head along the roots of the horns, for a number of days. The ox soon began to feed well, and in a few weeks was sold for market. It is a severe remedy, throwing the animal into extreme agony."

Dr. Cooper, in the last Philadelphia edition of Willich's "Domestic Encyclopedia," directs, For the *hollow horn*, saw off the diseased part; dress with turpentine; keep the animal warm, and do not starve him. It is a disease owing to want of food and exposure to cold.

Remedy for Cattle when choked by Roots or other substances. Mr. Joseph Wingate, of Maine, in a communication for "The New England Farmer," (Vol. III. page 57,) says, that every farmer should have a rope, which is to be put down into any animal's throat when choked with any hard substance, such as a turnip, potato, or an ear of corn. "I have used this rope, and never found the least difficulty in giving immediate relief. Many cattle have died for the want of it, and many have been killed outright by using other means. Take an old tarred rope, six feet long. Let it be *served* [strongly wound round with twine], and, when finished, be one inch in diameter. When put down the throat it should be pushed gently down four feet and a half into a cow or an ox. In cold weather it is stiff enough, but in warm weather it should be wet with cold water before it is used."

Mr. E. Williams, of Westford, New York, in "The New England Farmer," (Vol. III. p. 81,) directs to an easier method to relieve this complaint: "It is merely to pour down the throat one quart of very strong soap suds. I have seen it tried in numerous instances, and *invariably* with the best effect. It affords instantaneous relief."

BARNS. It is a common practice, and with many a general rule, to build a farm-house adjoining, and perhaps in contact with the sheds, barns, and other outhouses. When the buildings are thus all situated in one clump, if one takes fire, the whole will, probably, be consumed. Besides, it is disagreeable and unwholesome to live too near manure heaps, and as it were in the midst of your herds of cattle and swine. The barn should, therefore, be placed at a convenient distance from the dwellinghouse and other buildings, but as near as may be without danger of fire, or annoyance from the effluvia of manure heaps. Too low a spot will be miry in spring and fall. Too high an eminence will be inconvenient for drawing in loads, and on account of saving and making manure. If other circumstances permit, it may be best to place a barn in such a manner as to defend the dwellinghouse from the force of the coldest winds.

The size of the barn should be proportionate to the produce of the farm; for in this country, where building is not expensive, all the hay and grain should be placed under cover. It is a bad practice to leave hay in stacks, in the meadows where it is cut, to be there foddered out to the cattle in the course of the winter. By this mode of management the manure is almost lost. The ground under and near the stack receives some benefit from the droppings of the cattle, the litter, hay-seeds, &c. of the stack. But this benefit is trifling, as the sun, air, and rains, soon exhale and wash away the manure, which, being left on the surface of the soil, is soon given to the winds and the waters.

The farmers of the older parts of Pennsylvania, generally, build very large barns, and to prevent the hay or grain from heating in a large mow, four poles or pieces of timber are set up in the middle, so as to form within them a square space of about two feet. The poles are braced by cross-pieces at certain distances. Through the aperture thus made, the extra moisture in the hay or grain has a chance to escape, so as to prevent its being mow-burnt. Their barns are usually built of stone, and in the walls a large number of small holes are made for the admission of air. Their cattle are chiefly all housed, and their dung is under cover, when thrown out of the stables to prevent its being injured by the rains. The roofs of the barns are usually painted, to preserve them against the weather.

"The floor of the barn should be kept tight, so that the grain cannot fall through in threshing; and for this purpose it should have a layer of thin boards under it. It is most advisable also to have a place set apart in the barn for the purpose of storing away the grain after it is threshed. The bins for the grain should be made of hard plank, to prevent the rats and mice from eating through them, and should have lids, which can be fastened down with padlocks." — *Farmer's Assistant.*

The following description of a large barn built in the town of Hancock, Berkshire county, Massachusetts, by the family of Shakers located in that place, was originally published in the Middletown (Conn.) "Sentinel."

"The barn is built on ground inclining southwardly, in a perfect circle, and is ninety feet in diameter across it from side to side. The walls are of stone, twenty-two feet in height, of a suitable thickness, and laid in lime, and well pointed on each side. Round the barn, on the inner side, are stables, forming a circle, the manger within, and suitable places over it to throw or feed down the hay; the stable and manger occupy about twelve feet, and are eight feet high; the stables open to and from several different barn-yards, in order to make as many and such divisions of stock as they have thought proper. The covering of the stables forms the barn floor, which also extends round the barn There is but one large door-way for entrance with teams and loads; this is from the northern side, from an offset or causeway, eight feet above the base, and of course fourteen feet below the eaves. The cart or wagon that enters with a load makes the whole circuit of the floor, and after unloading comes out at the same door; thus eight or ten teams with their loads can occupy the floor at one time in unloading, and not hinder each other. Within this circle of the stables and barn floor is an area or *bay*, as it is usually called, which is filled with hay, &c., which must be over sixty feet in diameter. This is pitched *in* and *on* from any side or place most convenient, or where wanted. The roof comes to a point at the centre, and sheds off the rain all round, something similar to an umbrella. It is supported from the inner circle of the barn floor. The roof boards are laid up and down, which, by a transverse sawing of the log, were all brought to a point, and then shingled round in the usual mode."

A writer for "The New England Farmer," whose communication was published, (Vol. III. p. 81,) describes "a barn of ordinary size, and the main part of it built in the usual shape, but a good deal neater and tighter. The bays were upon each side of the floor, and the bottoms of them were sunk eight feet below it. This gave room for a large quantity of hay below the floor. The large doors were towards the south, to admit the sun, when necessary, with a small door in one of the large ones to enter at, when the weather was windy and made it dangerous to open the large doors. Barns ought always to have a small door to use in the winter, when you must often be in and out. There were twelve squares of glass arranged over the door, to admit the light when the large doors were shut; besides a small window in each of the gable ends, very near the ridge, for the same purpose. Under the floor was a convenient cellar, in which were kept potatoes, and all kinds of vegetables for green fodder in the winter. The cellar was a very warm one, and well lighted with two windows. This cellar struck me as being the most useful apartment in the whole establishment. There you may keep as many turnips, cabbages, potatoes, &c., as you please, and they are always handy to fodder out in the stable to your cattle; and the cattle need scarcely go out of the stable in a month.

"The yard was well watered by an aqueduct, and a trough on the south side of the barn was kept always full. Upon the north or back side of the barn were the stables: they were built in one building, and joined to the main part, about twenty-five feet in width, thirty feet long, and twelve or fourteen feet high. A door led from the barn into it, besides another from without upon the east side, where the cattle were admitted from the yard. A floor was laid overhead, at the distance of seven feet from the lower one The stalls were arranged on each side of the building, so that the cattle stood with their heads towards the outside of the building, leaving a space in the middle to pass.

"In foddering, the hay was pitched from the bay in the barn through a window, over the stables, and then put down into racks; very little hay could be wasted in this way, and the boys could be trusted with the foddering. The manure made in the stable was put down through the floor into another cellar, large enough to admit of a cart and team to take it away."

A Report of the Committee on Farms, in the county of Essex, for the year 1824, states, that Colonel Moses Newhall, in West Newbury, "has lately built a barn, which, for convenience and durability of construction, is worthy of much praise. It is calculated better for the farmer's use than any one we have seen. It is not too much to say, that during the haying season, the most busy season with the farmer, its superior conveniences will save at least the labor of one man on the farm. It is about eighty feet in length, thirty-four feet in width, and twenty feet post. It has two floors, one eight feet above the other; on the upper of which the hay is carried in."

The Shakers of Harvard, Massachusetts, have built a barn, which is probably larger than any other structure of the kind in the United States. The dimensions are *one hundred and fifty feet in length, and forty-five in width.* It is four stories in height, and the calculation is, to drive in on the upper floors, from the hill side, and pitch the hay down, thus rendering much hard labor easy.

Barn-Yards. The following "Remarks on the Construction and Management of Cattle Yards," are from the pen of Judge Buel, of Albany

"Vegetables, like animals, cannot thrive or subsist without food; and upon the quantity and quality of this depends the health and vigor of the vegetable, as well as of the animal. Both subsist upon animal and vegetable matter, both may be surfeited with excess, both may be injured by food not adapted to their habits, their appetites, or their digestive powers. A hog will receive no injury, but great benefit, from free access to a heap of corn or wheat, where a horse or cow will be apt to destroy themselves by excess. The goat will thrive upon the boughs and bark of trees, where the hog would starve. The powerful, robust maize will repay, in the increase of its grain, for a heavy dressing of strong dung; for which the more delicate wheat will requite you with very little but straw. The potato feeds ravenously, and grows luxuriantly, upon the coarsest litter; while many of the more tender exotics will thrive only on food upon which fermentation has exhausted its powers. But here the analogy stops: for while the food of the one is consumed in a sound, healthy, and generally solid state, the food of the other, before it becomes aliment, must undergo the process of putrefaction or decomposition, and be reduced to a liquid or æriform state.

"I have gone into the analogy between animals and vegetables thus far, to impress upon the minds of our farmers the importance of saving, and of applying the food of their vegetables with the same care and economy that they do the food of their animals. How scrupulously careful is the good husbandman of the produce of his farm, destined to nourish and fatten his animals; and yet how often careless of the food which can alone nourish and mature his plants: while his fields are gleaned, and his grain, hay, and roots carefully housed, and economically dispensed to his animals, the food of his vegetables is suffered to waste on every part of his farm. Stercoraries we have none. The urine of the stock, which constitutes a moiety of the manure of animals, is all lost. The slovenly and wasteful practice of feeding at stacks in the fields, where the sole of the grass is broken, the fodder wasted, and the dung of little effect, is still pursued. And, finally, the little manure which does accumulate in the yards, is suffered to lie till it has lost full half of its fertilizing properties, or rotted the sills of the barn; when it is injudiciously applied, or the barn removed to get clear of the nuisance. Again: none but a slothful farmer will permit the flocks of his neighbours to rob his own of their food; yet he often sees, but with feeble efforts to prevent it, his plants smothered by pestiferous weeds, and plundered of the food which is essential to their health and vigor. *A weed consumes as much food as a useful plant.* This, to be sure, is the dark side of the picture; yet the original may be found in every town, and in almost every neighbourhood.

"Is it surprising, that under such management, our arable grounds should grow poor, and refuse to labor its accustomed reward? Can it be considered strange, that those who thus neglect to feed their plants should feel the evil of light purses, as well as of light crops? Constant draining or evaporation, without returning any thing, would in time exhaust the ocean of its waters. A constant cropping of the soil, without returning any thing to it, will in like manner exhaust it of its vegetable food, and gradually induce sterility. Neither sand, clay, lime, or magnesia, which are the elements of all soils, nor any combination of part or all of them, is alone capable of producing healthy plants. It is the animal and vegetable matter accumulated upon its bosom, or which art deposits there with the auxiliary aid of these materials diffused in the atmosphere, that enables the earth to teem with vegetable life, and yield its tribute to man and beast."

Judge Buel suggests the following cheap and practicable mode of *providing food for vegetables;*

"The cattle yard should be located on the south side of and adjoining the barn. Sheds, substantial stone walls, or close board fences, should be erected at least on the east and west sides, to shelter the cattle from cold winds and storms; the size proportioned to the stock to be kept in it. Excavate the centre in a concave form, placing the earth removed upon the edges or lowest sides, leaving the borders ten or twelve feet broad, of a horizontal level, to feed the stock upon, and from two to five feet higher than the centre. This may be done with a plough and scraper, or shovel and hand-barrow, after the ground is broken up with the plough When the soil is not sufficiently compact to hold water, the bottom should be bedded with six or eight inches of clay, well beat down, and covered with gravel or sand. This last labor is seldom required, except where the ground is very porous. Here should be annually deposited, as they can be conveniently collected, the weeds, coarse grass, and brakes of the farm; and also the pumpkin vines and potato tops. And here also should be fed out, or strewed as litter, the hay, stalks, and husks of Indian corn, pea and bean haulm, and the straw of grain not wanted in the stables. To still further augment the mass, leached ashes and swamp earth may be added to advantage. These materials will absorb the liquid of the yard, and, becoming incorporated with the excrementitious matter, double or treble the ordinary quantity of manure. During the continuance of frost the excavation gives no inconvenience; and when the weather is soft, the borders afford ample room for the cattle. In this way, the urine is saved, and the waste incident to rains, &c. prevented. The cattle should be kept constantly yarded in winter, except when let out to water, and the yard frequently replenished with dry litter. Upon this plan, from ten to twelve loads of unfermented manure may be obtained every spring for each animal; and if the stable manure is spread over the yard, the quality of the dung will be improved, and the quantity proportionably increased. Any excess of liquid that may remain after the dung is removed in the spring, can be profitably applied to grass, grain, or garden crops. It is used extensively in Flanders, and in other parts of Europe.

"Having explained my method of procuring and preserving the food of vegetables, I will proceed to state my practice in feeding or applying it. It is given, every spring, to such hoed crops as will do well upon coarse food, (my vegetable hogs and goats.) These are corn, potatoes, ruta baga, beans, and cabbages. These consume the coarser particles of the manure, which would have been lost during the summer in the yard; while the plough, harrow, and hoe eradicate the weeds which spring from the seeds it scatters. The finer parts of the food are preserved in the soil, to nourish the small grains which follow. The dung is spread upon the land as evenly as possible, and immediately turned under with the plough. It is thereby better distributed for the next crop, and becomes intimately mixed and incorporated with the soil by subsequent tillage. Thus, upon the data which I feel warranted in assuming, a farmer who keeps twenty horses and neat cattle, will obtain from his yards and stables, every spring, two hundred loads of manure, besides what is made in summer, and the product of his hogsty. With this he may manure annually ten or twelve acres of corn, potatoes, &c., and manure it well. And if a proper rotation of crops is adopted, he will be able to keep in good heart, and progressively to improve, sixty acres of tillage land, so that each field shall be manured once every four or five years, on the return of the corn and potato crop."

DAIRY. The celebrated Arthur Young has the following remarks on this subject:

"Unless the farmer has a very diligent and industrious wife, who sees minutely to her dairy, or a most honest, diligent, and careful housekeeper to do it for him, he will assuredly lose money by his dairy; trusted to common servants, it will not pay charges. The dairymaid must be up every morning at four o'clock, or she will be backward in her business. At five the cows must be milked, and there must be milkers enough to finish by six. The same rule must be observed in the evening.

"In making butter, the dairymaids are particularly attentive to one circumstance, that there must be a certain proportion of *sour* in the cream, either natural or artificial, or they cannot insure a good churning of butter; some keep a little of the old cream for that purpose; others use a little runnet; and some a little lemon juice."

In order to determine which cow's milk is best for cream, it has been recommended to let the milk of each be put by itself, and churn each separately.

The properties requisite in a dairy-house are, that it be cool in summer and moderately warm in winter, so as to preserve nearly the same temperature throughout the year, which, according to Loudon, should be about forty-five degrees. A northern exposure, as much under the shade of trees as possible, is to be preferred. A well-constructed butter dairy, says Loudon, should consist of three apartments; a milk house, a churning house, with proper boiler, as well as other conveniences for scalding and washing the implements, and a room to keep them in, and for drying and airing them, when the weather will not permit of its being done without doors. The cheese dairy should likewise consist of three apartments: a milk house, a scalding and pressing house, and a salting house. To these should be added a cheese room, or loft, which may with great propriety be made above the dairy. This is, however, generally separate from the dairy. But a milk dairy requires only a good milk house, and a room for scalding, cleaning, and airing the utensils.

A dairy for the private use of any farmer or family need not be large, and may very economically be formed in a thick-walled dry cellar, so situated as to have windows on two sides; the north and east in preference for ventilation; and in order that these windows may the better exclude cold in winter and heat in summer, they should be fitted with double sashes; and on the outside of the outer sash should be a fixed frame of close wire netting or haircloth, to exclude flies and other insects.*

On Making and Preserving Butter. The dairy-house should be kept neat, should not front the south, southeast, or southwest. An apartment in a sweet and well-ventilated cellar will answer a good purpose to keep milk and cream in. Cheeses should not be set to dry in the same room where your milk is set, for they communicate an acid matter to the surrounding air, which will have a tendency to make the milk sour. The milk room and cheese room should therefore be separate apartments. It will be well to place your milk room, if possible, over a spring or brook, near the dwellinghouse; and you may have a stone floor, and channels in the floor to pass the water round near the inside of the walls. Into these channels the pans may be set, filled with milk, and surrounded by water. If water could be introduced into the milk room so as to fall from some height on the pavement, it would likewise prove advantageous, as the waterfall and the evaporation it causes will contribute to preserve the air continually pure, fresh, and cool. As the milk itself when brought in warm will naturally tend to raise the temperature of the milk room too high, it is recommended to have an ice-house attached to the dairy, especially where the advantage of a current of water cannot be obtained. An ice-house would prove still more profitable if the dairy be situated near large towns, where the ice could be sold in summer. According to Dr. Deane, the temperature of the milk room should be from fifty to fifty-five degrees of Fahrenheit's thermometer; and "The Complete Grazier" says, "Where the temperature of the milk room has become affected by the carrying of newly drawn milk into it, it may be easily reduced to the proper temperature by suspending a small quantity of ice at a considerable height from the floor; and if, during winter, the cold should become too great, a barrel of hot water closely stopped, or a few hot bricks placed on the floor or table of the milk room, will readily counteract its effects. But on no account whatever should a chafing-dish with burning coals be used, as it will certainly impart a bad taste to the milk."

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* For several different plans of dairy-houses, see Loudon's Encyclopædia of Agriculture," Par. 6800, &c.

The proper receptacles for milk are tin or earthen pans, not glazed nor lined with lead, or wooden trays. Lead, copper, or brass utensils, as well as earthenware vessels glazed with lead, ought on no pretext whatever to be used; for the açid which is contained in milk combines with these metals, and forms a poisonous compound with them. Sir John Sinclair recommends vessels made of cast iron, softened by annealing them in charcoal, so that they will not break by an ordinary fall, turned smooth in the inside, and laid over with a coat of tin, to prevent the iron from coming in contact with the milk. These milk dishes are stated to be kept more easily clean than wooden vessels; and their superior power of conducting heat cools the milk so rapidly, that the Scottish farmers' wives, who have given them a fair trial, affirm that they throw up *one third more cream* from an equal quantity of milk.* Cast-iron vessels, without being tinned, would give no poisonous quality to the milk, but they might render the produce of the dairy unpalatable.

"All dairy utensils ought to be most carefully scoured, first with hot water, and afterwards rinsed with cold, and kept in an airy place, in order that every possible degree of acidity may be removed. Should one or two scourings be insufficient, they must be repeatedly cleansed until they become entirely sweet, as the slightest taint or acidity may cause material loss."† Slate, according to some accounts, makes very good milk coolers, and perhaps freestone might answer as well.

The quality and quantity of cows' milk greatly depends on the nature of their food. Potatoes, carrots, and parsnips are recommended as causing cows to give excellent milk; and mangel-wurtzel is highly spoken of for the same purpose. Cabbages, if sound, answer an excellent purpose, but the decayed leaves give a bad taste to the milk. It is thought best to milk cows three times a day if fully fed, and great caution should be exercised by the persons employed to draw the milk from them completely, not only to increase the quantity of produce, but to preserve its quality. Any portion which may be left in the udder seems gradually to be absorbed into the system, and no more is formed than enough to supply the loss of what is taken away; and by the continuance of the same mode a yet further diminution takes place, until at length scarcely any is produced. This last mode of milking is practised when it is intended to render a cow dry.

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* Agricultural Report of Scotland. † The Complete Grazier.

"After the milk is drawn from the cow, it should be carefully strained through a linen cloth or a hair sieve, (Dr. Anderson prefers a sieve made of silver wires, on account of its superior wholesomeness,) into the cream dishes, which should never exceed three inches in depth, though they may be made so wide as to contain any quantity required, and which ought to be perfectly clean, sweet, and cool. If any ill flavor is apprehended from the cows having eaten turnips, &c., the addition of one eighth part of boiling water to the milk before it is poured into the dishes will effectually remove it.* When filled, the dishes ought to be set upon shelves or dressers, there to continue till the cream is removed. This should be steadily done by means of a skimming dish, if possible, without spilling any upon the floor, because it will speedily taint the air of the room; and the cream poured into a vessel, till enough be obtained for churning"

The "Farmer's Assistant" judiciously observes, "If new milk be kept as warm as when it comes from the cow, no cream will rise on it; but when sufficiently cooled, the cream separates from the rest and rises to the top. In order then to effect this to the best advantage, the new milk should be made as cool as possible, and the cooler it is thus made the more suddenly and effectually the cream will rise. To set milkpans made of tin in beds of salt would no doubt be useful, where the cellar is too warm; and to set all milk vessels on a floor which is constantly covered with cold spring water is also an excellent plan."

The following remarks relative to the best mode of making butter, are chiefly derived from Dr. Anderson's valuable Essay on that subject. 1. The milk first drawn from a cow is always thinner, and inferior in quality to that afterwards obtained; and this richness increases gradually to the very last drop that can be drawn from the udder. 2. The portion of cream rising first to the surface is richer in quality and greater in quantity than that which rises in the second equal space of time, and so of the rest, the cream decreasing and growing worse as long as it rises at all. 3. Thick milk produces a smaller proportion of cream than that which is thinner, though the cream of the former is of a richer quality. If thick milk therefore be diluted with water, it will afford more cream than it would have yielded in its pure state, though its quality will at the same time be inferior. 4. Milk carried about in pails, or other vessels, agitated and partly cooled before it is put into the milkpans, never throws up such good and plentiful cream as if it had been put into proper vessels immediately after it came from the cow.

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* Mr. Young has recommended the dairyman to boil two ounces of nitre in one quart of water, and to bottle the mixture; of which, when cold, a large tea-cupful is to be added to ten or twelve quarts of milk as soon as it comes from the cow. The quantity of saltpetre is to be increased as the turnips become stronger. The feeding of cows with the *roots alone* will, as the earl of Egremont found, prevent the milk from having a bad taste. Another method of removing any ill flavor arising from the cows having eaten turnips, consists in warming the cream, and afterwards pouring it into a vessel of cold water; from which the cream is to be skimmed as it rises to the surface, and thus the unpleasant taste will be left behind in the water.

From these fundamental facts, the Doctor deduces, in substance, the following rules :

1. The cows should be milked as near the dairy as possible, to prevent the necessity of carrying and cooling the milk before it be put into the dishes; and as cows are much hurt by far driving, it must be a great advantage in a dairy farm to have the principal grass fields as near the dairy or homestead as possible. In this point of view, also, the practice of feeding cows in the house, rather than turning them out to pasture in the field, must be obviously beneficial. *

2. The practice of putting the milk of all the cows of a large dairy into one vessel, as it is milked, there to remain till the whole milking be finished, before any part is put into the milkpans, seems to be highly injudicious, not only on account of the loss sustained by the agitation and cooling, but also, the more especially, because it prevents the owner

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* Mr. Lawrence, in his "Treatise on Cattle," observes, that "it is stated by theoretical writers, that to feed cows in the home stall increases their quantity of milk; a fact which various experiments compel me to disprove. With me it has ever had the effect of adding to the substance of the animal, and of diminishing the quantity of her milk ; probably from defect of the exercise she was wont to take in collecting her food, and the selection of herbage she was enabled to make." This writer, however, is of opinion, that "the aggregate quantity of milk in a dairy may be enlarged by keeping pastures free from the tread of the cows, since a greater number may be kept, perhaps by one third, on the same extent of ground; at the same time the animals may be secured from the harassing and debilitating effects of the sun and flies."

of the dairy from distinguishing the good from the bad cow's milk, so as to enlighten his judgment respecting the profit that he may derive from each. Without this precaution, he may have the whole of his dairy produce greatly debased by the milk of one bad cow for years together, without being able to discover it. A better practice, therefore, would be to have the milk drawn from each cow separately put into the creaming pans as soon as milked, without being ever mixed with any other; and if these pans were all made of such a size as to be able to contain the whole of one cow's milk, each in a separate pan, the careful *dai*[*] would thus be able to remark, without any trouble, the quantity of milk afforded by each cow every day, as well as the peculiar qualities of the cow's milk. And if the same cow's milk were always to be placed on the same part of the shelf, having the cow's name written beneath, there never could be the smallest difficulty in ascertaining which of the cows it would be for the owner's interest to dispose of, and which he ought to keep and breed from.

3. If it be intended to make butter of a *very fine quality*, it will be advisable, not only to reject entirely the milk of all those cows which yield cream of a bad quality, but also, in every case, to keep the milk that is first drawn from the cow at each milking entirely separate from that which is got last; as it is obvious, if this be not done, the quality of the butter must be greatly debased, without adding much to its quantity. It is also obvious, that the quality of the butter will be improved in proportion to the smallness of the quantity of the last drawn milk which is used, as it increases in richness to the very last drop that can be drawn from the udder at that time; so that those who wish to be singularly nice will do well to keep for their best butter a very small proportion of the last drawn milk.

Dr. Anderson proceeds to state in substance, that in the Highlands of Scotland the common practice is to let the calf suck till the dairymaid judges that it has had enough; it is then separated, the legs of the mother having been previously shackled by a very simple contrivance, to oblige her to stand still, and the dairymaid milks off what is left by the calf. In this way, he observes, the Highland butter has been greatly celebrated as the "richest marrowy butter which can anywhere be met with." The milk which is first drawn, and consequently of inferior quality, may be converted into an inferior kind of butter, sold sweet, or made into cheeses, which, by being made of sweet milk, if made with care and skill, may be of fine quality.

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[*] A provincial word, denoting the person who has the chief concern in a dairy.

Churning ought to be regularly continued till the butter *comes*, or is formed. If the motion in summer be too quick, the butter will, in consequence, ferment, and become ill-tasted ; and, in winter, it will *go back*. Churning, it is said, may be made easier by putting the bottom of the pump churn about one foot deep into a vessel of cold water, and continuing it there till the butter is made. The addition of one or two table-spoonfuls of distilled vinegar, after churning awhile, will, it is said, produce butter much sooner, in many instances, than it can be formed without such addition.

Some writers advise to wash the butter, after it is formed, thoroughly in several waters, till all the milk is removed. Dr. Anderson, however, advises to force the milk out of the cavities of the butter by means of a flat, wooden ladle, furnished with a short handle, at the same time agitating the butter as little as possible, lest it become tough and gluey. "The beating up of butter," he observes, "by the hand, is an indelicate practice, particularly if it be constitutionally warm; and as it is hurtful to the quality of the butter to pour cold water on it during this operation, the butter, if too soft to receive the impression of the mould, may be put into small vessels, and there be permitted to float in a trough of cold water beneath the table, *without wetting the butter*, which will soon become sufficiently firm. Or, when butter is first made, after as much of the milk has been got out as possible, it may be thinly spread on a marble slab, and the remaining moisture be absorbed by patting it with clean dry towels."

It is said, in Bordley's "Husbandry," that "dashing in water, and then, without pause, clearing the butter from every particle of the water, is widely different from washing butter by kneading and letting it remain at all in the water. Very good butter for flavor, color, and consistence, is made by one who washes it twice, but never lets it remain in the water a moment." Another butter-maker says, mix the salt in the butter in the evening, and let it rest till morning, then work out the liquor, but never let it be once touched with water.

Dr. Anderson remarks, that a considerable degree of strength as well as dexterity is required in the working of butter. The thing wanted is, to force out the milk entirely, with as little tawing [working] of the butter as possible, for if the milk be not entirely taken away, the butter will spoil in a short time; and if it be much worked the butter will become tough and gluey, which greatly debases its quality.

Before you put butter into the vessels which are to contain it, great care must be taken that they be well seasoned by frequent washing and exposure to the air for two or three weeks. As it is difficult to season new firkins, it will always be preferable to employ those which have been used. The most speedy method of seasoning firkins is by the use of unslacked lime, or a large quantity of salt and water, well boiled, with which they should be repeatedly scrubbed, and afterwards thrown into cold water, to remain there three or four days, till wanted. They should then be scrubbed as before, and well rinsed with cold water; and before the butter is put in, *every part* of the inside of the firkin must be well rubbed with salt.

Butter may be salted by working into it one or two ounces of salt, after the buttermilk has been forced out. The salt should be thoroughly incorporated, and be of the best and purest quality. Dr. Anderson, however, recommends the following preparation, which he has experienced to be much superior, as it not only prevents the butter from becoming in any degree rancid, but also improves its appearance, and imparts a sweeter and richer taste than could be given by common salt only. For every pound of butter take half an ounce of best common salt, one quarter of an ounce of loaf sugar, and one quarter of an ounce of saltpetre; beat and blend the whole completely together. Butter thus cured, should stand three or four weeks before it is used, that the salts may be well mixed. The best butter is made in summer, but by adding a certain portion (which experience alone can determine) of the juice expressed from the pulp of carrots to the cream previously to churning, winter-made butter will thus acquire the appearance and flavor of butter that has been churned during the prime part of the summer season.

A writer for "The Journal of Humanity" gives the following rules for making good butter. "If you have four or five cows, it is best to churn every day; and by no means less frequently than every other day. If you cannot churn every day, throw into the cream, when gathered, a handful of nice salt. In very warm weather, when milk sours soon put two heaping table-spoonfuls of salt into every pail of milk before straining. The quantity as well as the quality of the butter is greatly improved by this method. If you have ice, put a small piece in every pan of milk, and also into the cream when you churn. If you have no ice, put the cream into a pail, and hang it in the well twelve hours before churning. In the warm season, cream should be skimmed as soon as it is in the least sour, and in the coldest weather, milk should not stand more than thirty-six or forty-eight hours. The utmost care should be taken to keep every article used in making butter perfectly sweet, by frequent and thorough scalding."

A writer for "The New England Farmer," (Vol. VI. p. 370,) observed as follows:

"It does not, in my opinion, improve the butter to have the milk sour before the cream is gathered; but at this season of the year [June] it can hardly be prevented. It should, however, never be suffered to stand till the milk curdles. When the cream is gathered it should be set in an open vessel, where the air can have free access to its surface; and during the time that the cream is gathering for a churning of butter, it should have a stick or spoon kept in the vessel where the cream is, by which the cream should be stirred at least half a dozen times a day, enough to mix it up well, and bring a new portion of it to the air; and it should stand before the window of the milk room, or some other, the most airy position afforded by the room. When you have gathered a mess for this season of the year, fill your churn over night with cold water, and empty it in the morning. Put in your cream and churn it with a regular, steady, and not too rapid motion. It will generally come in from ten to twenty minutes, and when fetched it needs no coloring matter.

"I know that women say flies will get into the cream if left uncovered; let them get in, and pick them out, rather than cover up the vessel containing the cream.*

"The windows to milk rooms, in many houses, are not sufficiently large, with from four to eight small panes of glass. This affords too stinted a portion of air. If your glass is small, you want a twenty-four lighted window to the milk room, with blinds to exclude the sun. If two such windows, so situated as to afford a draught of air, the better. But stint your milk room of air, and keep the cream-pot covered tight to exclude flies, and your butter will be *white* and *bitter*, besides being a long while coming."

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* Perhaps a covering of gauze, millinet, or other light and porous substance, or a lid perforated with small holes, might admit air and exclude the flies. — *Editor.*

Making Butter in Winter. A friend has furnished us with the following observations on this subject:

"In February, 1825, I spent a few days with Dr. Jones, who lives near Hyco Bridge, in Halifax County, Virginia Mrs. Jones prepares her cream for churning by heating the milk after it has stood twelve or twenty-four hours.

"She places it over coals the evening before churning, until the milk as it stands with the cream on is heated ready to boiling, when she sets it by till morning. The cream is then skimmed off, and churned by stirring in an earthen vessel. The butter is delicately white and clear in its complexion, firm, and fine flavored.

"This process would, no doubt, prove more successful in any part of New England, since the climate of Virginia is generally less favorable to the dairy than that of the eastern States."

From the same pen we are favored with the following:

Garlic in Butter. "When milk has the flavor of garlic, or wild onion, add a quart of boiling water to each gallon, and set it away in vessels, having the bottom covered the thickness of an inch only with milk. The cream that rises will be sweet and free from any disagreeable flavor."

L. Peters, Esq. of Westborough, Massachusetts, says, relative to making winter butter, "My wife's method is, to set the vessels in which the cream is collected near the fire a while before it is put into the churn, and frequently stir it a little, and turn the vessels, that it may be warmed equally, till it is as warm as cream in the summer, as near as she can judge; and before putting it into the churn, that is scalded with scalding water. When the churning commences, it is done moderately, and if there is any frothy appearance, then warm water is put in, the churn put near the fire, and occasionally turned, till the temperature is altered, and the churning is finished, which is generally in a short time. If a dash churn is used, set it into a tub of hot water, and frequently move the dash a little, to mix the warm and cold cream, till it is of a suitable warmth, which an observing person will soon ascertain by practice."—*New England Farmer*, Vol. VI. p. 370

A valuable paper on the making of butter in cold weath by the Rev. W. Allen, states the results of several trials, b which it appears that butter may be obtained in the coldest weather within from ten to twenty minutes, if the cream at the commencement of the churning is brought to the temperature of about seventy-five degrees Fahrenheit.

E. H. Derby, Esq. of Salem, Massachusetts, recommends the making of butter by the aid of frost, as follows:

"The milk when taken from the cows is immediately strained into earthen pans, and set in the coldest part of the house; as soon as the frost begins to operate, a separation takes place, the cream rises in a thick paste to the top, and leaves the milk, without a particle of cream, frozen in the pan. The cream is not so hard but that it can be easily scraped off with a spoon, to the solid ice; it is then set aside until a sufficient quantity is collected for churning, when it is warmed just so much as to thaw the cream sufficiently to put it into the churn. I have never known it to require more than five minutes to convert such cream into butter, after the churning had commenced."

CHEESE,—*Method of making.* "The milk is universally set for cheese as soon as it comes from the cow.

"The management of the curd depends on the kind of cheese: thin cheese requires the least labor and attention.

"Breaking the curd is done with the hand and dish. The finer the curd is broken the better, particularly in thick cheeses The best color of this kind of cheese is that of bees-wax, which is produced by annotta, rubbed into the milk after it is warmed. The dairywoman is to judge of the quality by the color of the milk, as it differs much in strength. The runnet is prepared by taking some whey and salting till it will bear an egg; it is then suffered to stand over night, and in the morning it is skimmed and racked off clear; to this is added an equal quantity of water brine, strong as the whey, and into this mixture some sweet-briar, thyme, or some other sweet herbs; also a little black pepper and saltpetre; the herbs are kept in the brine three or four days, after which it is decanted clear from them Into six quarts of this liquor four large calves' bags, or, more properly called, calves' stomachs, are put. No part of the preparation is heated, and frequently the calves' bags are only steeped in cold salt and water. Turning the milk differs in different dairies, no two dairywomen conducting exactly alike.

"Setting the milk too hot inclines the cheese to heave, and cooling it with cold water produces a similar effect. The degree of heat varies according to the weather. The curd when formed is broken with what is called a treple cheese knife. The use of this is to keep the fat in the cheese. It is drawn the depth of the curd two or three times across the tub, to give the whey an opportunity of running off clear; after a few minutes the knife is more freely used, and the curd is cut into small pieces like checkers, and is broken fine in the whey with the hand and a wooden dish. The curd being allowed about half an hour to settle, the whey is laded off with the dish, after it is pretty well separated from the curd.

"It is an almost invariable practice to scald the curd. The mass is first broken very fine, and then the scalding whey is added to it and stirred a few minutes; some make use of hot water in preference to whey, and it is in both cases heated according to the nature of the curd; if it is soft, the whey or water is used nearly boiling; but if hard, it is only used a little hotter than the hand. After the curd is thoroughly mixed with the hot stuff, it is suffered to stand a few minutes to settle, and is then separated as at the first operation. After the scalding liquor is separated, a vat, or what is often called a cheese hoop, is laid across the cheese ladder over the tub, and the curd is crumbled into it with the hands, and pressed into the vat, to squeeze out the whey. The vat being filled as full and as firmly as the hand alone can fill it, and rounded up in the middle, a cheese cloth is spread over it, and the curd is turned out of the hoop into the cloth; the vat is then washed, and the inverted mass of curds, with the cloth under it, is returned into the vat and put into the press; after standing two or three hours in the press, the vat is taken out, and the cloth is taken off, washed, and put round the cheese, and it is replaced in the vat and in the press. In about seven or eight hours it is taken out of the press and salted, the cheese is placed on a board, and a handful of salt is rubbed all over it, and the edges are pared off if necessary; another handful of salt is strewed on the upper side, and as much left as will stick to it; afterwards it is turned into the bare vat without a cloth, and an equal quantity of salt is added to it, and the cheese is returned into the press; here it continues one night, and the next morning it is turned in the vat, and continues till the succeeding morning, and the curd is taken out and placed on the dairy shelf: here they are turned every day or every other day, as the weather may be. If it is hot and dry, the windows and door are kept shut; but if wet or moist, the door and windows are kept open night and day."

Cleaning the Cheese. "The cheeses having remained about ten days after leaving the press, are to be washed and scraped in the following manner: a large tub of cold sweet whey is placed on the floor, the cheeses are immersed in it, where they continue one hour, or longer, if necessary, to soften the rind. They are then taken out and scraped with a common case-knife, with great care, so as not to injure the tender rind, till every part of the cheese is smooth; they are after the last operation rinsed in the whey and wiped clean with a coarse cloth, and placed in an airy situation to dry, after which they are placed in the cheese room. The floor of the cheese room is generally prepared by rubbing it with bean or potato tops, or any succulent herb, till it appears of a black wet color. On this floor the cheeses are placed, and turned twice a week; their edges are wiped hard with a cloth once a week, and the floor is cleansed and rubbed with fresh herbs once a fortnight. They must not lie too long or they will stick to the floor. This preparation of the floor gives the cheese a blue coat, which is considered of great consequence."

Stilton Cheese, how made. "The Stilton cheese, which may be called the Parmesan of England, is not confined to Stilton and its vicinity, for many farmers in Huntingdonshire, and also in Rutland and Northamptonshire, make a similar sort, sell them for the same price, and give them the name of the Stilton cheeses.

"Take the night's cream and put it into the morning's new milk with the runnet; when the curd is separated, let it not be broken, as is done with other cheese, but take it out, disturbing it as little as possible, and suffer it to dry gradually in a sieve; and as the whey separates, compress it gradually till it has acquired a firm consistence; then place it in a wooden hoop, and suffer it to dry very gradually on a board, taking care at the same time to turn it daily with close binders round, and which must be tightened as the cheese acquires more solidity."

Cheese, Skippers in. "Wrap the cheese in thin brown paper, so thin that moisture may strike through soon; dig a hole in good sweet earth about two feet deep, in which the cheese must be buried about thirty-six hours, and the skippers will be found all on the outside of the cheese ; brush them off immediately, and you will find your cheese sound and good."

To prevent Cheese having a rancid, nauseous flavor. "Put about one table-spoonful of salt to each gallon of milk, when taken from the cows in the evening, for the cheese to be made the next day ; put the salt at the bottom of the vessel that is to receive the milk ; it will increase the curd, and prevent the milk from growing sour or putrid, the hottest nights in summer." — *Massachusetts Agricultural Repository.*

[The following is from the pen of a friend, to whom we are indebted for several valuable articles, written expressly for this work.]

"*To make Cheese.* A person whose dairy enjoys a high reputation gives the following directions for making cheese :

" 'Take a gallon and a half of water and throw into it a pint and a half of common salt. Boil and skim it, and add three or four ounces of rose leaves. After it is sufficiently steeped, let it cool, and put in one ounce of saltpetre and four runnets. A great-spoonful of this preparation is enough to turn fifteen gallons of milk. When the curd is made, dip it out carefully, and put it into a cloth that sits in a vessel with its bottom perforated with holes. Let a person on each side of the cloth take up the corners, and raise the curd carefully, and turn it from one side to the other in the cloth, in order to the better draining off the whey ; then lay it as before, in a vessel perforated with holes, and thus turn it once in fifteen or twenty minutes, and in the intervals place a follower upon it, with a stone above ; cutting the curd through each time. When the whey is out, season it with salt to suit your palate, while cutting it up in small pieces with a suitable knife ; then put it up for pressing. Let it stand under thirty or forty pounds' weight twenty-four hours, and then turn it, and let it stand twenty-four hours more under the same. A severe pressure, which is sometimes given, spoils a rich cheese entirely.

" 'Set your cheese in closets made for the purpose, which flies cannot enter.

" 'The outside may be rubbed with a mixture of butter and Spanish brown, which answers very well, but other mixtures may answer equally well.

" 'A small quantity of otter, say the size of a kernel of rye, *sewed up in a cloth*, may be put in each curd.

"'Never wash out your cheese cloth with soap, but boil it out in whey.'"

HEMP. The following essay on the culture of Hemp, by Hon. HENRY CLAY, was originally published in "The Western Agriculturist." It is a complete treatise on the best manner of raising and preparing an article, which always commands cash sufficient to reward liberally the cultivator who proceeds correctly in obtaining this valuable product. The author of the essay is not less favorably known as a statesman than as a practical and scientific agriculturist, and his name will give it that weight and currency with American farmers which is due to its intrinsic excellence.

"The preparation of the ground for sowing the seed is by the plough and horses, until the clods are sufficiently pulverized or dissolved, and the surface of the field is rendered even and smooth. It should be as carefully prepared as if it were for flax. This most important point, too often neglected, cannot be attended to too much. Scarcely any other crop better rewards diligence and careful husbandry. Fall or winter ploughing is practised with advantage; it is indispensable in old meadows, or old pasture grounds, intended for producing hemp.

"Plants for seed are ordinarily reared in a place distinct from that in which they are cultivated for the lint. In this respect, the usage is different from that which is understood to prevail in Europe. The seeds which are intended to reproduce seeds for the crop of the next year, are sowed in drills about four feet apart. When they are grown sufficiently to distinguish between the male and female stalks, the former are pulled and thrown away, and the latter are thinned, leaving the stalks separated seven or eight inches from each other. This operation is usually performed in the blooming season, when the sexual character of the plants is easily discernible; the male alone blossoming, and, when agitated, throwing off farina, a yellow dust or flour, which falls and colors the ground, or any object that comes in contact with it. A few of the male plants had better be left, scattered through the drill, until the farina is completely discharged, for an obvious reason. Between the drills a plough is run sufficiently often to keep the ground free from weeds and grass; and between the stalks in each drill the hoe is employed for the same object The seed plants are gen erally cut after the first smart frost, between the 25th September and the middle of October, and carried to a barn or stack-yard, where the seeds are easily detached by the common flail. They should be gathered after a slight, but before a severe frost; and, as they fall out very easily, it is advisable to haul the plants on a sled, and, if convenient, when they are wet. If transported on a cart or wagon, a sheet should be spread to catch the seed as they shatter out. After the seeds are separated, the stalks which bore them being too large, coarse, and harsh, to produce lint, are usually thrown away; they may be profitably employed in making charcoal for the use of powder-mills In Europe, where the male and female plants are promiscuously grown together in the same field, both for seeds and for lint, the male stalks are first gathered, and the female suffered to remain growing until the seeds are ripe, when they are also gathered; the seeds secured and lint obtained, after the rotting, from both descriptions.

"After the seeds are threshed out, it is advisable to spread them on a floor, to cure properly and prevent their rotting, before they are finally put away for use the next spring. Seeds are not generally used unless they were secured the fall previous to their being sown, as it is believed they will not vegetate if older; but it has been ascertained that when they are properly cured and kept dry, they will come up after the first year. It is important to prevent them from heating, which destroys the vegetating property, and for that purpose they should be thinly spread on a sheltered floor.

"The seeds, whether to reproduce seeds only, or the lint, are sowed about the same time. Opinions vary as to the best period. It depends a good deal upon the season. The plant is very tender when it first shoots up, and is affected by frost. Some have sowed as early as the 1st of April; but it is generally agreed, that all the month of May, and about the 10th of it especially, is the most favorable time. An experienced and successful hemp grower, in the neighbourhood of Lexington, being asked the best time to sow hemp, answered, immediately before a rain. And undoubtedly it is very fortunate to have a moderate rain directly after sowing.

"When the object is to make a crop of hemp, the seeds are sown broad-cast. The usual quantity is a bushel and a half to the acre; but here again the farmers differ, some using two bushels or even two and a half. Much depends on the strength and fertility of the soil, and the care with which it has been prepared, as well as the season. To these causes may be ascribed the diversity of opinion and practice. The ground can only sustain and nourish a certain quantity of plants; and if that limit be passed, the surplus will be smothered in the growth. When the seeds are sown, they are ploughed or harrowed in; ploughing is best in old ground, as it avoids the injurious effect of a beating rain, and the consequent baking of the earth. It would be also beneficial subsequently to roll the ground with a heavy roller.

"After the seeds are sown, the labors of the cultivator are suspended, until the plants are ripe, and in a state to be gathered; every thing in the intermediate time being left to the operations of nature. If the season be favorable until the plants are sufficiently high to shade the ground, (which they will do in a few weeks, at six or eight inches' height,) there is strong probability of a good crop. When they attain that height, but few articles sustain the effect of bad seasons better than hemp.

"It is generally ripe and ready to be gathered about the middle of August, varying according to the time of sowing Some sow at different periods, in order that the crop may not all ripen at the same time, and that a press of labor in rearing it may be thus avoided. The maturity of the plant is determined by the evaporation of the farina, already noticed, and the leaves of the plant exhibiting a yellowish hue: it is then generally supposed to be ripe, but it is safest to wait a few days longer. Very little attentive observation will enable any one to judge when it is fully ripe. In that respect it is a very accommodating crop, for if gathered a little too soon, the lint is not materially injured, and it will wait the leisure of the farmer some ten days or a fortnight after it is entirely ripe.

"Two modes of gathering the plants are practised, one by pulling them up by the roots, an easy operation with an able-bodied man, and the other by cutting them about two inches (the nearer the better) above the surface of the ground. From a quarter to a third of an acre is the common task of an average laborer, whether the one or the other mode is practised. The objections to pulling are, that the plants with their roots remaining connected with them, are not afterwards so easily handled in the several operations which they must undergo ; that all parts of the plant do not rot equally and alike, when exposed to the dew and rain ; and, finally, that before you put them to the brake, when the root should be separated from the stalk, the root drags off with it some of the lint. The objection to cutting is, that you lose two or three inches of the best part of the plant nearest the root. Pulling, being the most ancient method, is most generally practised. I prefer, upon the whole, cutting ; and I believe the number who prefer it is yearly increasing. When pulled, it is done with the hand, which is better for the protection of an old leather glove. The laborer catches twenty or thirty plants together, with both hands, and by a sudden jerk draws them without much difficulty. The operation of cutting is performed with a knife, often made out of an old scythe, resembling a sickle, though not so long but broader. This knife is applied much in the same way as the sickle, except that the laborer stoops more.

"Whether pulled or cut, the plants are carefully laid on the ground, the evener the better, to cure ; which they do in two or three days, in dry weather. A light rain falling on them whilst lying down is thought by some to be beneficial, inasmuch as the leaves, of which they should be deprived, may be easier shaken off or detached. When cured, the plants are set up in the field in which they were produced, in shocks of convenient size, the roots or butt ends resting on the ground, and the tops united above by a band made of the plants themselves. Previous to putting them up in shocks, most cultivators tie the plants in small hand bundles of such a size as that each can be conveniently held in one hand. Before the shocks are formed, the leaves of the plants should be rapidly knocked off with a rough paddle or hooked stick. Some suffer the plants to remain in these shocks until the plants are spread down to be rotted. Others, again, collect the shocks together as soon as they can command leisure, (and it is clearly the best,) and form them into stacks. A few farmers permit these stacks to remain over a whole year, before the plants are exposed to be rotted. By remaining that period in stalks, the plants go through a sweat, or some other process, that improves very much the appearance, and, I believe, the quality of the lint, and this improvement fully compensates the loss of time in bringing it to market. The lint has a soft texture and a lively hue, resembling water-rotted hemp ; and I once sold a box of it in the Baltimore market at the price of Russia hemp. In every other respect, the plants are treated as if they were not kept over a year.

"The method of dew-rotting is that which is generally practised in Kentucky. The lint so spread is not so good for many purposes, and especially for rigging and ships, as when the plants have been rotted by immersion in water, or, as it is generally termed, water-rotted. The greater value, and consequently higher price of the article, prepared in the latter way, has induced more and more of our farmers every year to adopt it; and if that prejudice were subdued, which every American production unfortunately encounters when it is first introduced and comes in contact with a rival European commodity, I think it probable that in a few years we should be able to dispense altogether with foreign hemp. The obstacles which prevent the general practice of water-rotting are, the want of water at the best season for the operation, which is the month of September; a repugnance to the change of an old habit; and a persuasion, which has some foundation, that handling the plants after their submersion in water during that month is injurious to health. The first and last of these obstacles would be removed by water-rotting early in the winter, or in the spring. The only difference in the operation, performed at those seasons and in the month of September, would be, that the plants would have to remain longer in soak before they were sufficiently rotted.

"The plants are usually spread down to be dew-rotted from the middle of October to the middle of December. A farmer who has a large crop on hand puts them down at different times for his convenience in handling and dressing them. Autumnal rotting is more apt to give the lint a dark and unsightly color than winter rotting. The best ground to expose the plants upon is meadow or grass land, but they are not unfrequently spread over the same field on which they grow. The length of time they ought to remain exposed depends upon the degree of moisture and the temperature of the weather that prevail. In a very wet and warm spell five or six weeks may be long enough. Whether they have been sufficiently rotted or not is determined by experiment. A handful is taken and broken by the hand or applied to the brake, when it can be easily ascertained, by the facility with which the lint can be detached from the stalk, if it be properly rotted. If the plants remain on the ground too long, the fibres lose some of their strength, though a few days longer than necessary, in cold weather, will not do any injury. If they are taken up too soon, that is, before the lint can be easily separated from the woody part of the stalk, it is harsh, and the process of breaking is difficult and troublesome. Snow-rotting, that is, when the plants, being spread out, remain long enough to rot, (which however requires a greater length of time,) bleaches the lint, improves the quality, and makes it nearly as valuable as if it had been water-rotted.

"After the operation of rotting is performed, the plants are again collected together, put in shocks or stacks, or, which is still better, put under a shed or some covering. When it is designed to break and dress them immediately, they are frequently set up against some neighbouring fence. The best period for breaking and dressing is in the months of February and March, and the best sort of weather, frosty nights and clear thawing days. The brake cannot be used advantageously in wet or moist weather. It is almost invariably used in this state out of doors and without any cover; and to assist its operation, the laborer often makes a large fire near it, which serves the double purpose of drying the plants and warming himself. It could not be used in damp weather in a house without a kiln or some other means of drying the stalks.

"The brake in general use is the same hand brake which was originally introduced and has been always employed here, resembling, though longer than the common flax brake. It is so well known as to render a particular description of it, perhaps, unnecessary. It is a rough contrivance, set upon four legs, about two and a half feet high. The brake consists of two jaws with slits on each, the lower jaw fixed and immovable, and the upper one movable, so that it may be lifted up by means of a handle inserted into a head or block at the front end of it. The lower jaw has three slats or teeth, made of tough white oak, and the upper two, arranged approaching to about two inches in front, and in such manner that the slats of the upper jaw play between those of the lower. These slats are about six or seven feet in length, six inches in depth, and about two inches in thickness in their lower edges; they are placed edgewise, rounded a little on their upper edges, which are sharper than those below. The laborer takes his stand by the side of the brake, and grasping in his left hand as many of the stalks as he can conveniently hold, with his right hand he seizes the handle in the head of the upper jaw, which he lifts, and throwing the handful of stalks between the jaws, repeatedly strikes them by lifting and throwing down the upper jaw. These succesive strokes break the woody or reedy part of the stalks into small pieces or shoes, which fall off during the process. He assists their disengagement by striking the handful against a stake, or with a small wooden paddle, until the lint or bark is entirely clean, and completely separated from the woody particles.

"After the above operation is performed, the hemp may be scutched, to soften it, and to strengthen the threads That process, however, is not thought to be profitable, and is not therefore generally performed by the grower, but is left to the manufacturer, as well as that of beating and hackling it. Scutching is done by the laborer taking in his left hand a handful of the lint, and grasping it firmly, then laying the middle of it upon a semicircular notch of a perpendicular board of the scutching-frame, and striking with the edge of the scutch that part of the lint which hangs down on the board. After giving it repeated strokes, he shakes the handful of lint, replaces it on a notch, and continues to strike and turn all parts of it, until it is sufficiently cleansed, and the fibres appear to be even and straight.

"The usual daily task of an able-bodied hand at the brake is eighty pounds' weight ; but there is a great difference not only in the state of the weather and the condition of the stalks, produced by the greater or less degree in which they have been rotted, but in the dexterity with which the brake is employed. Some hands have been known to break from one hundred and fifty to two hundred pounds per day. The laborer ties up in one common bundle the work of one day, and in this state it is taken to market and sold. From what has been mentioned, it may be inferred, as the fact is, that the hemp of some growers is in a much better condition than that of others. When it has been carelessly handled or not sufficiently cleansed, a deduction is made from the price by the purchaser. It is chiefly bought in our villages, and manufactured into cotton bagging, bales, and other kinds of untarred cordage. The price is not uniform. The extremes have been as low as three and as high as eight dollars for the long hundred, the customary mode of selling it. The most general price during a term of many years has been from four to five dollars. At five dollars it compensates well the labor of the grower, and is considered more profitable than any thing else the farmer has cultivated."

"The quantity of net hemp produced to the acre is from six hundred to one thousand weight, varying according to the fertility and preparation of the soil and the state of the season. It is said that the quantity which any field will produce may be anticipated by the average height of the plants throughout the field. Thus, if the plants will average eight feet in height, the acre will yield eight hundred weight of hemp; each foot in height corresponding to a hundred weight of the lint.

"Hemp exhausts the soil slowly, if at all. An old and successful cultivator told me that he had taken thirteen or fourteen successive crops from the same field, and that the last was the best. That was, however, probably owing to a concurrence of favorable circumstances. Nothing cleanses and prepares the earth better for other crops (especially for small grain or grasses) than hemp. It eradicates all weeds, and when it is taken off, leaves the field not only clean, but smooth and even."

FLAX. The following observations on this subject, are extracted from "Essays on Flax Husbandry, by S. W. Pomeroy, Esq., First Vice President of the Massachusetts Society for Promoting Agriculture."

Change of Seed. Notwithstanding it is an opinion well established among experienced flax-growers in this country, that a change of seed is advantageous, it is apprehended that they are not aware of the extent of the benefit to be derived by selecting seed from a soil or climate essentially different; and it may be owing to a want of attention in this particular, that the flax crops are so uncertain, and the quality inferior, however perfect in other respects the system may be conducted. Mr. Young observes, that "foreign flax-seed was universally used in Ireland, when it could be obtained; otherwise they were careful to procure seed which grew upon soil of an opposite quality from that which was to be sown; that American seed was to be preferred, and produced finer flax than any other." Baltic seed produced more, but of a coarser quality. It is well known that American seed always bears the highest price in the Irish market

Mr. Pomeroy cites a number of examples to show the importance attached to the culture of flax in Europe, "and to justify the conclusion, that in this country a continued, judicious change of seed will be indispensable to the successful prosecution of flax husbandry ; and a further inference may be drawn, that experiments on various soils, with seed the growth of different climates, are requisite to direct the farmer to the quarter from whence his best seed may be obtained. Here opens a legitimate field for our numerous agricultural societies to labor in : on their exertions the farmer must depend in the outset ; but let it once be ascertained that Riga seed is best in one section, Dutch or German in others, and mercantile interest, if not patriotism, will distribute them.

"Should it be objected to importing seed on account of the expense, we reply, that large quantities of linseed oil are constantly imported, and the difference of price between our own seed and that imported will not much exceed what is now paid for good clean seed for sowing or export, and that which is sold for crushing; but if it is fifty cents per bushel, or more, it can be no object, compared with the advantages that may be reasonably expected to result ; and the farmer need not be told, that 'in all his operations parsimony is never so ill judged as when it is exercised in the selection of his seeds.' It is not pretended, however, but that, from the great variety of soil and climate in the United States, the object in view might be obtained without importation ; yet it may be important to have a good stock to begin with, when trials could be instituted with its produce. At any rate, it cannot be expected that individuals will embark in such a course of experiments, either with foreign or domestic seed, unless encouraged by agricultural societies, or other public bodies."

In speaking of the soils most suitable for flax, Mr. Pomeroy observes, "The soils which rank first in this country, are the flat bottoms that are covered by the fall and spring floods, which subside early enough in the season to get in a crop; those river flats on the second banks that have a depth of strong alluvial soil; the reclaimed marshes and swamps, with a black unctuous soil, not too peaty, with as much clay in the composition as will permit its being rendered soon dry and mellow, and not retain water on or near the surface ; if it stands two feet below, so much the better, but it must be well guarded by ditches and dykes against sudden freshets. Such is the soil of the province of Zealand, where more flax is raised, and of better quality, than in any other part of Holland. The next in estimation are the strong black loams on clay or hard pan, that will retain moisture. Yellow loams, with a holding subsoil, may be rendered suitable for flax by proper cultivation; and since the discovery that plaster of Paris is an excellent manure for it, a crop may be obtained with much more certainty on lighter land than formerly. Perhaps the characteristic of best garden mould may be applied to a flax soil, viz., retaining sufficient moisture, and all that falls, without ever being saturated; but on any soils the surface should be completely pulverized, and never be worked when wet.

"No dung should be applied to the land when the flax is sown, but may be put on bountifully with the previous crop. The objection is, that dung forces the growth so rapidly, that the plants draw weak, have a thin harl, and are the more liable to lodge. Lime, marl, shells, leached ashes, &c. do not produce such effects. Top-dressings, soon after the plants appear, of plaster, ashes, soot, &c., are highly beneficial, as they not only encourage the growth, but are a protection against worms, which sometimes attack young plants, and may be considered the only enemy they have except weeds.

"Salt has been mentioned by the late Dr. Elliot, of Connecticut, as an excellent manure to plough in with flax, at the rate of five bushels to the acre;* probably more would be better. Plaster is now much used in Duchess county, the best cultivated district in New York, as a manure for flax, on which its good effects are as apparent as on corn.

"The late chancellor Livingston viewed a piece of flax on the 20th of May, 1791, belonging to a poor tenant, very injudiciously sown on a dry sandy declivity; it looked so extremely sickly that the tenant thought of ploughing it up; the chancellor gave him three bushels of plaster, which was sown the next morning before the dew was off, and had the satisfaction of seeing his tenant gather more flax from his half acre in an uncommon dry season, than was produced from any acre in the neighbourhood.

"The best preparatory crops in this country at present appear to be potatoes, corn, and roots; they will most generally repay the extra manure, and, if well managed, check the production of weeds.

"The following rotations may serve as an outline subject, to be varied, and hemp or other crops introduced, as circumstances require, viz.:

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* See Elliot's Essays on Field Husbandry.

"No. I. *Low, cold, or reclaimed Soils.*
1st year, *Potatoes.*
2d do. FLAX, with seeds.
3d do. *Herd's grass* and *ed top*, or *tall meadow oat grass*, to continue three years or more, and the course repeated.

"No. II. *Strong Uplands.*
1st year, *Potatoes* or *corn.*
2d do. *Corn* or *roots.*
3d do. FLAX, with seed
4th do. *Clover.*
5th do. *Orchard grass* or *herd's grass*, to continue three years or more.

"No. III. *Light Lands.*
1st year, *Potatoes* or *corn.*
2d do. *Corn* or *roots.*
3d do. FLAX, with seed.
4th do. *Clover*, to be mown once, the after growth to be turned in, and rye sown thick on the furrow, which may be soiled or fed in the spring by sheep or milch cows, and ploughed in fou
5th year, *Corn.*
6th do. *Spring wheat* or *barley.*
7th do. *Clover;* and the course to be pursued as before; when flax will occupy the land every seventh year. In all cases, except when hemp is substituted, the tillage crops should receive the dung.

"If the land is ploughed into beds or convex ridges, like turnpike roads, about a rod wide, especially if low and level, the crop will be much more secure from injury by heavy rains, and the grass crops will be better if it remains in that form. On any soils, fall ploughing in narrow ridges will facilitate its early working in spring, and should not be dispensed with."

Mr. Pomeroy gives the following directions relative to *choice of seed.*

"That of the last year's growth should be obtained if possible. The usual marks of good seed are, that it be plump, oily, and heavy, of a bright brown color, sinking readily in the water, and when thrown into the fire to *crackle* and *blaze* quick. A very simple method of trial is, to sprinkle it thin between two pieces of wet paper, which plunge into a hot-bed or dunghill, and in less than twenty-four hours the proportion that will vegetate can be discerned, which should be ascertained, in order to regulate the *quantity to be sown.*

"On this head no particular directions can be given, as it depends on the various qualities of soil, goodness of seed, &c. The rule for sowing small grains is *reversed;* flax requiring to be sown thickest on rich soil, as not more than one stalk is wanted from a plant. In England and Scotland never less than two, nor more than three bushels to the acre are sown. Two and a half is the most usual portion. In Flanders and Ireland seldom less than three bushels are sown, except when seed is an object. Thick sowing is to obtain fine flax. In this country it will be important at present to sow at such a rate as will insure good crops of each; and experience only can determine the exact point. It is probable that six pecks is the least, and two bushels the extent that should be sown to obtain the most profitable results, till the demand for seed is considerably lessened."

Sowing. Mr. Pomeroy recommends sowing as early as it is possible to prepare the ground; says that it is important that the seeds should be equally distributed, and "fortunately what has long been a desideratum is now attained. A machine for sowing small seeds broad-cast with perfect regularity has lately been invented, and performs to great satisfaction." *

Weeding. "Weeding is considered in Europe, and by good husbandmen in this country, as necessary to secure a good crop of flax, which is a very tender plant when young, and more easily checked in its progress by weeds than any other. It is not supposed to be injured by the clover and grass sown with it; on the contrary, the Flemish farmers think them beneficial, by protecting the tender roots from drought, and keeping the weeds under. It should be carefully wed when the plants are three or four inches high; they are not then injured by the laborer going barefooted over them."

Pulling. "This should be performed as soon as the leaves begin to fall and the stalks show a bright yellow color, and when the bolls are turned a little brown. The seed will continue to ripen afterwards. When the flax is lodged, it should be pulled immediately, in any stage of its growth, or it will be entirely lost. Great care is requisite in sorting the different lengths, and keeping them separate till after the flax is hackled, or much waste will ensue in that process."

Saving Seed. "As soon as the flax is dry enough to be put under cover, it should be rippled, as it is termed. A comb, resembling the head of a rake, but with teeth longer and nearer together, made of hickory or oak, is fastened up on a block, and the flax, taken in parcels no longer than the hands can firmly grasp, is drawn through, and the bolls rippled off; attention to sorting at the same time should be continued. The bolls are to be riddled and winnowed immediately; spread thin on a clean floor, or on sheets, in the sun, and when sufficiently dry, and beginning to open, threshed. By this method, the foul seeds are completely separated with little trouble, and good clean seed is ready for an early market, often the best, without the use of expensive machinery to make it so. Here the operations of the farmer ought to end; the process of preparation being foreign to and unconnected with his other pursuits; and which has been the greatest objection to extensive flax culture. Can there be a reason why the farmer is to prepare his flax more than the hides of his cattle, which he sends to the tanner? They are both chemical processes; and to dissolve the glutinous or resinous substances by which the fibres are attached to the stem, without impairing their strength, is perhaps as critical, and requires as much care and judgment, as to extract the animal juices from the hides, and fill the pores with tannin. In short, the flax grower and flax preparer and dresser should be distinct professions. They are said to be so in Flanders and Holland, and were extensively so in Scotland, where the farmer sold his flax on the ground, or in sheaves at his barn or rick.

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* Bennett's machine for sowing broad-cast; a description and drawing of which are given in the "Memoirs of the Philadelphia Agricultural Society," Vol. IV, with ample testimony of its usefulness. It is pushed forward by a man, like a wheel-barrow, and will sow more than one acre in an hour, unimpeded by wind or light rain.

"The preparation of flax by steeping is very general in the great flax-growing countries in Europe, but it is not quite finished in the water. It remains spread some days on the grass, which is necessary to render it soft, and give that silvery appearance so desirable. The destructive process of dew-rotting is most commonly practised in this country, and when water is resorted to, it is at an improper season and the process imperfect ; which is the cause of its being so harsh and brittle. Perhaps no part of the system requires such an allowance for difference of climate. In the humid atmosphere of Ireland, it is not very material when it is spread ; but in this climate, when exposed to a July or August sun, every drop after a shower becomes a burning-glass, and literally scorches the fibres : besides, such a highly putrid fermentation as will then take place in the water, though it separates the harl more speedily, not only injures it, but communicates a stain, that renders the process of bleaching much more tedious and expensive.

"The flax should not be put into the water till about the first of October, and remain from ten to fourteen days, according to the temperature of the weather; and should be taken out before the fibres will separate freely, spread on the grass, when the frost will very much assist the operation; and the flax exhibits a gloss and softness that it is impossible to give it otherwise. The following method of preparing hemp, will apply with great force to the point under discussion. During the late war, an experienced ship-master in Connecticut, and who was also a good farmer, raised a crop of hemp. As soon as it was dry enough to be stowed away, it was put under cover, and remained till October; was then put into clear soft water, till the fibres would separate with some difficulty, when it was spread on the grass; the frost completed the operation, and when dry it was immediately secured. There was no putrid fermentation to deteriorate the harl, nor was it mildewed by being exposed to the weather, and when dressed exhibited that fine silver-green hue by which the Russian hemp is distinguished;* and when worked up, was pronounced by the rope-makers to be equal to any hemp ever imported! Here is a lesson for our western brethren, that is worth more to them than mines of silver. Clear, soft, stagnant water, is preferred in Europe. A canal forty feet long, six broad, and four deep, is said to be sufficient for the produce of an acre of flax, at one time. It should be formed on a clay or some holding soil, where the water from a spring or brook can be conducted in with convenience; the expense would not be great, and on most farms suitable sites may be had. May not boiling or steaming be found the most advantageous process of preparing flax? The very superior sample of thread exhibited at Brighton, in 1818, for which Mrs. Crowninshield, of Danvers, received a premium, was spun from flax prepared by boiling. It appears by the 'Transactions of the Swedish Academy,' that a method was practised in Sweden of preparing flax to resemble cotton, by boiling it ten hours in salt water, spreading on the grass, and frequently watering, by which it becomes soft and bleached. Boiling or steaming will not appear very formidable or expensive when we examine the subject. A box twenty feet long, six feet wide, and four deep, well constructed of stout planks, a boiler, from which a large tube extends into and communicates with the water in the box, will boil the produce of a quarter of an acre in a day; that is, if we allow double the room to boil in that is required for steeping. A steam-pipe, instead of the tube, and having the top of the box well secured, would permit the process of steaming to go on. It is probable that by either method, spreading on the grass will be necessary to obtain soft flax. The yarns of which the sail cloth is made at Paterson are all steamed. The navy board expressly forbid their being boiled in alkaline lye, as is usual in most manufactures of linen. It is from this precaution that their canvas has the pliable, oily feeling, which so much recommends it. It should not be lost sight of, that by boiling or steaming, much time and expense will be saved in bleaching.

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* The best Riga hemp supplied for the British navy is prepared by steeping; during which it is shifted three times.

"In dressing," says Mr. Pomeroy, "our climate gives a decided advantage over Ireland, Flanders, or the north of Europe, where flax is dried on hurdles, over a peat fire, in ovens, or kilns, requiring great care in regulating the heat, to prevent injury. All this trouble and hazard is obviated by our dry atmosphere and keen northwest winds. Dr. Deane estimated the expense of dressing flax by hand at one third of the product. I believe the present price does not vary much from his estimate. A respectable gentleman from Duchess county, New York, informed me that mills or machines, impelled by water, have been erected there, that break and completely dress the flax for a toll of one tenth! It is said one or more of them are in operation in the western part of this State. These mills were invented in Scotland, and are now said to be brought to great perfection. They are erected in all directions in the principal flax districts in Ireland, and notwithstanding the low price and limited demand for labor, are resorted to by the poorer classes of people, the dressing by hand being mostly abandoned. There are machines in England that dress the flax immediately from the field, without any preparation whatever. An account of them may be found in the fifth volume of the Massachusetts Agricultural Journal. It appears by the report of a committee of the House of Commons, that in 1817 they were in successful operation. A man and three children impelled the machines, and dressed sixty pounds a day. Should they be susceptible of the application of water or steam power in any degree proportionate, the advantage may be incalculable; but in the present inquiry, we place these machines, however desirable, entirely out of the question."

Product. "It is not uncommon in Great Britain and Ire land to obtain eight hundred pounds of flax from an acre! Six hundred pounds is estimated, in some districts, as an average; but it should be observed that little, if any, seed is obtained. The average crop in New England, as far as our information extends, cannot be estimated at more than two hundred pounds, and six or eight bushels of seed. (We do not include the rich bottoms on the Connecticut, and some other rivers.) Dr. Deane was of opinion, that four hundred pounds might be calculated on with proper management.

"We think that four hundred pounds of good clean flax, and eight or ten bushels of seed, may fairly be assumed as a medium crop on favorable soils, where the culture becomes such an object as to make other farming operations subservient to it, and due attention is paid to change of seed.

"Those who grow flax to any extent are of opinion, that the seed, at the price it has been for some years past, pays for all the labor bestowed on the crop to the time the flax is ready to be prepared or rotted."

WHEAT. To raise good wheat is considered, both in America and Europe, as an object of prime consequence to the cultivator, and agricultural writers have of course been very voluminous on the subject. We shall select and condense some of their remarks, which appear to us of the greatest importance, and add what our own observation and experience has suggested.

Wheat is thought to be the most useful of the farinaceous plants; and as the bounty of Providence has generally decreed, that those things which are most useful shall be most common, wheat accordingly will grow in almost any part of the globe. It thrives not only in temperate, but in very hot and in very cold regions: in Africa and Siberia, as well as in the United States and Great Britain. It requires a good loamy soil, not too light nor too heavy. The "Memoirs of the New York Board of Agriculture," (Vol. II. p. 28,) state, that "wheat grows best on land which contains just as much clay as can be combined with it without subjecting the wheat to be frozen out." And the author of that article, Mr. Amos Eaton, observes, "Since it is the clay which absorbs and retains most of the water injurious in wheat soils, I adopted a rule for the consideration of farmers, founded on that principle, and confirmed by all the observations I have been enabled to make. *Rule.* — Wash a little of the soil in a tumbler of water, and observe the time required for it to become clear. If the time required exceeds three hours, it may be considered as liable to be injured by frost." W. Van Dusen, a farmer of Rensellaer county, New York, says "that if wheat be sowed the last week in August, on clay soil, it will generally resist the effect of frost in the winter, and of insects in the spring." "A clay soil," according to the same work, "having absorbed a large proportion of water, becomes cellular as the water freezes, or rises up in various protuberances, so that the roots of the wheat plant become disengaged from their hold in the soil. It is very manifest, that if wheat be sowed so early that each plant may have time to extend its roots into the soil, its chance for retaining its hold will be better." We believe that not only clay, but lime, chalk, marl, or other calcareous substance, is necessary to bring wheat to perfection, and the grounds of our belief we shall exhibit hereafter.

"The Complete Farmer" says, that "the best time for sowing wheat is about the beginning of September. But if the earth be very dry, it had better be deferred till some showers have moistened the soil." Mr. Mortimer says, he has known wheat to be so musted and spoiled by laying long in the ground before rain came, that it never came up at all; to which he adds, "that he has seen very good crops of wheat from seeds sown in July." We should apprehend, however, that it would be necessary to feed wheat sown so early, in order to prevent its going to seed the first year, or getting too far advanced in its growth to resist the frosts of the succeeding winter. Sowing in dry ground is generally recommended for seeds ; but wheat, being liable to be smutty, is commonly prepared by steeping in brine or lime, and in consequence of the steep vegetation commences ; and if the seed in this state is placed in earth which is and continues for any time dry, vegetation is checked by the drought, which kills or greatly injures the seed.

Early sowing requires less seed than late, because the plants have more time, and are more apt to spread, and throw out a good number of stalks. More seed is required for poor than for rich lands, and rich land early sowed requires the least of any. Bordley's "Husbandry" says, "The climate and soil of America may be believed to differ greatly from those of England, respecting the growth of some particular plants. Wheat sown there, two to three bushels on an acre, yields great crops. Two bushels an acre sown in Maryland or Pennsylvania would yield straw without grain. In Maryland three pecks are commonly sown. I never had better crops than from half a bushel of seed wheat to an acre, in a few instances. In these instances the ground was perfectly clean and fine, after many ploughings or horse-hoeings of maize, [Indian corn,] on which the wheat was sown in September, whilst the maize was ripening. It was a clay loam, highly pulverized. But because of the loss of plants at other times, I preferred to sow three pecks an acre." "Grain which is thin sown, says the Complete Farmer, is less apt to lodge. Every one must have observed, that in places where foot-paths are made through wheat fields, by the side of the paths, where the corn is thin, and has been trodden down in winter and spring, the plants have stood erect, when most of the corn in the same field has been laid flat on the ground; an advantage proceeding from the circumstance of the stalks having more room."

"The Farmer's Assistant" asserts, that "the time for sowing wheat probably depends much on previous habit. Thus if it were sown a number of successive years by the middle of August, and then the time of sowing were changed at once to October, the crop would probably be much lighter on that account; yet where wheat has become habituated to be sown late it will do tolerably well. The later it is sown, however, the more seed is requisite. When early sown, a bushel to the acre is believed to be sufficient; but when sown later, a bushel and a half, or more, may be necessary." The estimate of seed, however, should be formed, not so much from the capacity of any particular measure, as from the number of grains which that measure contains. The larger and fuller the seed is, the greater quantity by measure will be required; the smaller, the less quantity. Much, therefore, must be left to the discretion of the farmer, who must take into consideration the time of sowing, the quality and preparation of the soil, as well as the plumpness or the shrivelled state of the seed wheat.

If naked summer fallows are used at all, they may as well be made preparatory to a crop of wheat. It may sometimes be expedient to suspend, for one season, the raising of crops of any sort on land which is exhausted or greatly infested with weeds; and during the summer and autumn, plough and harrow it several times, and thus thoroughly subdue it. When such a process is adopted, wheat is gen erally the succeeding crop. The custom of naked fallowing, however, is not much approved of in modern husbandry, and that mode of preparing for wheat is rarely adopted by scientific cultivators. Sir John Sinclair says, "The raising clean, smothering, green crops, and feeding stock with them upon the land, is not only much more profitable, as far as relates to the value of the crop substituted in lieu of a fallow, but is also a more effectual method of procuring large crops of wheat, or any other crop, which may succeed the green crop." There is a disadvantage sometimes attending fallows, which we apprehend may be more detrimental in our climate than in that of Great Britain. Land which is kept in a light and pulverized state is liable to be washed away by violent rains, and the showers of our summer season are usually more plentiful, and fall with more impetuosity than those of England, although the mean moisture is less, and there is less rain falls in the course of the year on this than the other side of the Atlantic.

In modern tillage, wheat more usually follows clover than any other crop; and Bordley's "Husbandry" says, "clover is the best preparative for a crop of wheat." In such case, English farmers, and indeed all others who *work it right*, give but one ploughing, and harrow in the seed by passing the harrow twice in a place the same way with the furrows. Mr. Bordley directs, that the operations of ploughing, harrowing, and sowing, should immediately follow each other. Mr. Macro, an eminent English farmer, says, "From upwards of twenty years' experience I am of opinion, that the best way of sowing clover lands with wheat, is to *plough the land ten or fourteen days before you sow it*, that the land may have time to get dry, and after rain to make it dress well. I am at a loss to account for the *wheat thriving better on lands which have been ploughed some time*, than it does on *fresh ploughed* lands which dress as well or better; but I have *often* tried both ways on the same lands, and always found the former answer best." Mr. Bordley, in attempting to account for this effect says, "I *conjecture* that the clover plants being buried and the wheat sown at the same time, they both ferment and run into heat in the same period; the germ then shoots, and the root is extremely delicate and tender for some days; during which, the buried herbage obtains its highest degree of heat; which, added to the internal heat of the germ, may, though only slightly, check and a little injure the delicate shoots of the wheat. In sprouting barley for making malt, a little *excess of heat* in the bed checks, and a little more totally stops the sprouting or growth of the roots. Both modes give crops superior to what are produced on fallow. Farmers may well try both methods, for determining which to prefer; that is, as well *immediate* sowing, on ploughing in the clover, as the method of sowing not till ten or fourteen days after having ploughed in the clover: suppose a half each way."

We believe that wheat would flourish better if it were buried deeper than it generally is in broad-cast sowing. Our opinion is founded on the following facts, relating to the physiology of the wheat plant. "A grain of wheat, when put into the ground at the depth of three inches, undergoes the following transformations: as soon as the farinaceous matter which envelopes the frame of the young plant contained within it is softened into a milky state, a germ is pushed out, and at the bottom of that germ small roots soon follow. The roots are gathering strength, whilst the germ, by the aid of the milky fluid, is shooting upwards; and when the milk is exhausted, the roots are in activity, and are collecting nourishment for the plant from the soil itself. This is analogous to the weaning of the young of animals, which are not abandoned by the mother till they can provide for themselves. But the care of nature does not end here; when the germ has fairly got above the surface, and become a plant, *a set of upper roots* are thrown out, close to the surface of the ground, which search all the superficial parts of the soil with the same activity as the under roots search the lower parts; and that part of the germ which separates the two sets of roots is now become a channel, through which the lower roots supply the plant with the nourishment they have collected. What an admirable contrivance to secure the prosperity of the plant! Two distinct sets of roots serve, in the first place, to fix the plant firmly in the ground and to collect nourishment from every quarter. The upper roots are appositely situated to receive all the nourishment that comes naturally from the atmosphere, or artificially as manure, to the surface; and serve the further purpose of being the base of new stems, which are tillered up, and so greatly increase the productiveness of the plant. The excellence of the drill system in grain may probably be perceived in this explanation; for in broad-cast sowing the seeds lie very near to the surface, and in this situation it is not only more exposed to accidents arising from birds, insects and the weather, but the two sets of roots are necessarily crowded together, so as almost to become indistinct; the plant is less firm, and has fewer purveyors, collecting food for it "*

Dr. Deane observed, that "wheat that is sowed in autumn, a clover ley excepted, should, instead of harrowing, be covered with a shallow furrow, and the surface left rough. It will be less in danger of being killed by the frost in winter, and less injured by drying winds in the following spring. The furrows should be left without harrowing; for the more uneven the ground is, the more the soil will be pulverized and mellowed by the frost." But if the crop which succeeds the wheat crop should require a smooth bottom, the land, after sowing, must be harrowed, and should be rolled. Some husbandmen advise, when wheat is sown on a clover ley, to plough in the clover with a deep furrow, then plough in the seed wheat with a shallow furrow; and if the next crop in the rotation requires a level bottom, it will be necessary to harrow and roll the field as smooth as possible, after having ploughed in the seed.

The greatest care should be exercised with regard to the kind, quality, and preparation of seed wheat. There are many varieties of wheat; but winter wheat, in the United States, is generally distinguished by only two appellations, red wheat and white wheat, of which the latter is held in highest estimation.

In preparing your seed wheat, the first thing to be attended to is, to clear it perfectly from every injurious foreign substance. "One error here may mar our whole system, and render our skill productive of as much evil as good. On poor and worn-out land, the evil of sowing a mixture of impure seed with grain or grass seed would be great; but where the ground is in high order the crop is more injured; the noxious plants take firmer hold, and are more difficult to be eradicated."† Indeed, it would be better for a farmer to pick over his seed wheat by single handfuls, and make a riddle of his fingers, than to sow cockle, darnel, tares, wild turnip seeds, and other vegetable nuisances, which are as intrusive as unwelcome, as tenacious of life as they are unworthy of existence. The first preparation therefore should be to screen, winnow, and riddle the grain till perfectly freed from these, and other improper ingredients. When this is thoroughly accomplished, washing and steeping, for the purpose of preventing smut, should meet attention. The first step in the processes to be instituted against smut, as recommended by Sir John Sinclair, is "to run the grain *very gently* through a riddle, when not only the smut balls, but the imperfect grains, and the seeds of weeds, will float, and may be skimmed off at pleasure." The same author enumerates, as modes by which smut may be prevented, 1. The use of pure cold water and lime. 2. Boiling water and lime. 3. Water impregnated with salt. 4. Urine pickle. 5. Lye of wood ashes. 6. A solution of arsenic. 7. A solution of blue vitriol. It seems that almost any acrid, corrosive, or poisonous application will secure a clean crop, if properly used for that purpose.

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* Mr. Featherstonhaugh's Essay on the Principles and Practice of Rural Economy.

† See a communication by O. Fiske, Esq., New England Farmer, Vol. I p. 222.

Mr. Arthur Young sowed fourteen beds with the same wheat seed, which was black with smut. The first bed was sown with this wheat without washing, and had three hundred and seventy-seven smutty kernels. A bed sowed with seed washed in clean water produced three hundred and twenty-five smutty kernels; washed in lime-water, forty-three do.; washed in lye of wood ashes, thirty-one do.; washed in arsenic and salt mixture, twenty-eight do.; steeped in lime-water four hours, two do.; steeped in lye four hours, three do.; steeped in arsenic four hours, one do. Again, that which was steeped in lye, as before mentioned, twelve hours, had none; and that which was steeped in the same kind of lye twenty-four hours had none; that also which was steeped twenty-four hours in lime-water had none; that steeped in arsenic twenty-four hours had five.

A correspondent of "The New England Farmer,"* (who is, we believe, a practical and scientific agriculturist, and whose statements are worthy of implicit confidence,) with the signature *Berkshire*, in giving directions for preparing seed wheat, observes: "The only successful course is to prepare the seed about ten days before sowing-time. This is done by selecting clean and plump seed, passing it through water in a tub, about half a bushel at a time, and washing it and skimming off the matter that floats; then empty it into a basket to drain, then lay it on a clean floor and rake in two quarts of slacked lime and one quart of plaster to the bushel, and if too dry sprinkle on water, and continue to stir it until all is covered with the lime and plaster. In this way you may proceed until you have prepared your whole seed. Let it remain in a heap one day, then spread it and move it daily, until it becomes perfectly dry; it is then fit to sow, and you may sow it if the land should happen to be quite wet."

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* See New England Farmer, Vol. I. p. 27€

We shall now speak of the liability of wheat to become winter-killed. The author of "Letters of Agricola" states, as an objection to the cultivation of wheat in Nova Scotia, "its liability to be thrown out in the spring, and thus subjecting the farmer to serious inconveniences, and often disappointment of a crop. Grasses are not exempt from the same hazard; and the hopes of the year are thus blasted by a cause which, in many cases, will admit of remedy, in all, of alleviation. I am not sure but sowing the wheat seed under furrow, at least four or five inches deep, in September, in order that it may extend its roots and take a firm hold of the soil before the approach of winter, and rolling it in the spring with the box heavily loaded, would obviate the evils of our climate, and enable us to cultivate that grain according to the improved modes of England. It ought to be recollected that even there, about sixty years ago, winter wheat was not of general cultivation, and the heaving of the soil was accounted a powerful obstacle to its success. In Scotland, too, during the same period, spring wheat almost universally prevailed; and her northern and bleak position was thought to be incapable of any change to the better, and utterly unfriendly to autumnal semination. The zeal and industry of British farmers, combined with their skill, have baffled all these gloomy predictions, and taught us at once to copy the example of our sires, and not to despair in the race of improvement."

A method, according to the same author, made use of in Norfolk, England, to guard wheat against the changes and inclemency of winter and spring, is to adopt the following rotation: "After a turnip crop, they sow barley the second year with clover seeds; the third year they cut hay, and plough down the ley, and sow their winter wheat on the matted sod. The roots of the grass bind the soil, and prevent it from heaving, which is much akin to the same effect produced by the tangled and bound surface of our new and cleared lands." This fact may suggest another inducement to sow wheat next in rotation after clover, as has been recommended.

It is well known that our lands, where the soil is at all suitable, will produce good crops of wheat when first cleared from their native growth of wood; but after having been tilled for some years, they generally yield wheat with difficulty, and it is often found impossible to raise it by any of the modes commonly adopted for wheat culture. In most parts of Massachusetts, and in some parts of New Hampshire and Vermont, the farmers scarcely ever attempt to raise wheat, and still more rarely succeed when they do attempt it. Yet, we believe, wheat was a common and profitable crop in those places in the early period of their settlement. In process of time, however, the land became exhausted of its wheat-bearing faculty, and our farmers were forced nearly to forego its cultivation. The same variations and appearances have likewise been observed in Europe. Wheat countries, by continued cultivation, have become almost incapable of yielding wheat. The cause and remedy of this partial barrenness, this falling off, with regard to particular plants, was alike involved in obscurity, till modern discoveries in chemistry threw light on the subject. It has been found that the texture of every soil is defective unless there is a mixture of three kinds of earth, viz., clay, sand, and *lime;* and that lime, in some of its combinations, exists in wheat, both in the straw and kernel. In some soils, fertile in other respects, lime may either have no existence, or be found in very minute portions, and be soon exhausted. If lime be a necessary constituent of wheat, and is not in the soil where we attempt to raise wheat, it must be supplied by art, or wheat will not grow. Or if native lime exists in the soil in small quantities, the land may bear wheat till the lime is exhausted, and then become incapable of producing that plant, till a fresh supply of lime, marl, pulverized bones, or some other calcareous substance, is added. Mr. Young says, ("Letters of Agricola," p. 299,) "It cannot be denied, that since the plentiful use of lime has been adopted, lands in Europe will produce wheat which otherwise were incapable of bearing it;" and quotes several instances in proof of this assertion. Dr. Anderson likewise gives an account of a field which had a top-dressing of lime for the purpose of raising wheat, but the lime, by accident, was not applied to a small patch of the field, and in that patch there was no crop, while every part of the field to which the lime was applied produced wheat luxuriantly. It would be easy to adduce many more instances to prove that lime, in Great Britain, is considered not only useful, but indispensable for the production of wheat. A British farmer, we believe, rarely undertakes to raise wheat *without* the use of lime, and an American farmer as rarely undertakes to raise it with the use of that substance for manure.

If the foregoing premises are correct, it would seem not impossible, and indeed scarcely improbable, that by the judicious use of lime, or other calcareous substances, wheat may be as well raised in New England as in the western States. The subject is certainly of very great importance, and deserves repeated experiments.

It will be objected against the use of lime, 1st, that it is too dear to be used for manure; and, 2dly, that our farmers do not know how to apply it, and, as it is a powerful substance, it may do more harm than good, unless in the hands of a chemist, or one practically acquainted with its operation. With regard to the dearness of lime, we are informed that there is no want of limestone in almost every part of the United States; and probably, by proper search, many more limestone quarries might be discovered in New England than are at present known. And the price of lime would, doubtless, be diminished by increasing the demand, because if great quantities were wanted for agricultural purposes, a greater number of persons would find their account in making a business of manufacturing it; improvements would be introduced in the processes connected with its manufacture, and of course it would be afforded cheaper. Besides, small quantities would alone be needed for the purpose of furnishing that calcareous matter which nature inclines to incorporate into the substance of wheat, clover, &c., and probably a top-dressing of two or three bushels to the acre would be of essential benefit, though doubtless more would, generally, be preferable. Mr. Young says "a small quantity of quicklime, scattered on the surface of lands newly cleared, will prove highly beneficial during the whole length of time they remain untilled. Thirty bushels of shells [lime fresh from the kiln] to the acre, slacked into a fine powder, will produce the most surprising effects, if not on the first crop of wheat, at all events. on the verdure, luxuriance, and quality of the future pasture."* A writer in the "*Museum Rusticum*," an

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* Letters of Agricola.

English work, says, "that he sows his wheat without laying on any manure, but, early in the spring, gives a top-dressing of twenty bushels of lime, pulverized, and mixed intimately with forty bushels of sand; and if the weather be dry, he doubles the quantity of sand." We are disposed to believe that at least lime enough for light top-dressings might b easily procured by almost every cultivator in the Union And such light dressings, if our theory is correct, would b all that is *indispensable* to the production of wheat.

With regard to the mode of applying lime, nothing ca be more simple. It should be evenly spread, after being water-slacked, on the surface of the soil, and not ploughed in, or, if ploughed in, it should be with a very shallow furrow, because its tendency is to sink below the reach of cultivation. If used in a quick or burning state, it will be safest o mix it with about double its quantity of sand, loam, clay, or some other material. The additional material may be made to correspond with the wants of the soil to which it is applied. Thus, if the soil has too much clay, mix sand with your lime; if too much sand, mix finely pulverized clay, &c.

It is said that British farmers apply lime in great quantities directly from the kiln in its most caustic state, even to land which is replete with putrescent or vegetable manure, and run the risk of consuming or wasting the manure by its corrosive qualities. But the soil of Great Britain is generally wetter than ours, and of course the lime sooner becomes mild. Besides, there is a great difference in the strength of lime, and that of the United States may be, generally speaking, stronger than the English lime. In short, we should advise every farmer to use quicklime as manure, in small quantities at first, mixed with a large proportion of earth, or some other substance, *to dilute it*, and thus take care not to burn his seed, his fingers, or his growing vegetables. And with these precautions, we would make use of it for wheat *as a top-dressing in spring*. We would likewise try it mixed with wood ashes, together with earth; for we have been told by a practical farmer, that ashes and lime form a union much more valuable than either separate.

In an article on the Culture of Winter Wheat, by R. H Gardiner, Esq., of Gardiner, Me., the writer observes, "The cultivation of winter wheat is preferable to that of summer on a great variety of accounts. It is sown and the ground prepared in a season of much greater leisure. One of the great disadvantages of our northern climate is he extreme shortness of our spring, so that it is difficult for our farmers to complete the work which is absolutely necessary to be done, after the frost is out of the ground, and before the season of planting is over. If, therefore, any work, as the sowing of wheat, can be advantageously postponed till the autumn, it is of great importance. The winter wheat is less liable to injury from insects than the summer; mine has never suffered from them. It affords good fall feed, and the larger quantity of roots and stubble to be ploughed in makes the land in a better state for the next crop. The grain is heavier, and the same number of pounds will yield a larger quantity of flour, and of a much superior quality. From my experience, I should recommend that winter wheat should not be sowed later than the middle of September, that the soil on which it is sowed should be of a light loam, and that about five pecks of seed be sown to the acre. I have also found the use of plaster on wheat advantageous, as also rolling the wheat, after it is well up."

To procure new varieties of wheats, (says Mr. Loudon,) the ordinary mode is to select from a field a spike or spikes from the same stalk which has the qualities sought for, such as larger grains, thinner chaff, stiffer straw, a tendency to earliness or lateness, &c.; and picking out the best grains from such ear or ears, to sow them in suitable soil, in an open, airy part of a garden. When the produce is ripe, select the best ears, and from these the best grains, and sow these; and so on, till a bushel or more is obtained, which may then be sown in a field apart from any other wheat. In this way many of the varieties of the common winter wheat have been obtained.* Other varieties have assumed their distinctive marks from having been long cultivated on the same soil and climate, and take local names, as the Hertfordshire red, Essex white, &c.

Marshall (Yorkshire) mentions a case in which a man of accurate observation, having in a piece of wheat perceived a plant of uncommon strength and luxuriance, diffusing its branches on every side, marked it, at harvest gathered it separately, and thus introduced a new and superior variety.

Jonathan Townsend, of Andover, Conn. gives the following directions for obtaining good crops of wheat, preceded by Indian corn: "Select a piece of ground suitable for Indian corn and winter grain; spread on evenly twenty common cart loads or upwards of stable and yard manure to the acre; plough it in just three inches deep and no more; harrow it lengthwise of the furrow; cross mark for the rows, three and a half feet for the small, or four feet for the large kind of corn; let the corn be properly tended, by keeping the ground loose with the plough and hoe, and free from weeds; and if the season is not very unpropitious, you may calculate on a large crop. But if the ground is hard and stony, so that it cannot be ploughed shallow as above mentioned, then plough as shallow as possible, and spread on the manure afterwards and harrow it in, and proceed as above directed; the crop will not probably disappoint your expectations. As soon as the corn has become ripe, or too hard to roast, and if possible before it is touched with frost, cut it up, bind and carry it out of the field, and shock it in the usual way. If you have drawn the earth around your corn into hills, (which I would advise never to do in any case,) harrow the hills down with a heavy harrow, plough three inches deep, and spread on evenly four or five loads of well rotted manure,* and sow three pecks of good clear wheat to the acre, and plough it in with a light horse plough; and unless something disastrous happens, the summer following your garner may be filled with the finest wheat. The same directions will apply to ground planted with potatoes. I would insure a crop sown on ground thus managed for ten per cent. less than if sown on a summer fallow in the ordinary way."

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* See also New England Farmer, Vol. X. p. 309.

Wheat is subject to several diseases; the most common and generally injurious are mildew or rust and smut. Some writers assert, that mildew is caused by a minute parasitic fungus or mushroom, which fastens on the leaves and glumes or stems of the living plant. The roots of this fungus, intercepting the sap intended by nature for the nourishment of the grain, render it lean and shrivelled, rob it of its flour, and the straw becomes black and rotten, unfit for fodder.

Mr. Butler, in "The Farmer's Manual," says, in substance, that the rust on wheat commences in July, at the time of the filling of the kernel in the ear, when a combination of heat and moisture bring into action rich manures, and forces into the straw, which has now finished its growth, more juices than the kernel can take up, being already filled out. These juices burst the straw, or pass through the natural pores of the stalk. When these juices come to the air, they lose by evaporation their thinner parts, become glutinous, and form the matter called rust or mildew.

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* It has generally been advised not to apply manure to a wheat crop the same year the wheat is sown, but the small quantity mentioned above would, perhaps, serve as a top-dressing, without giving too great luxuriance to the straw, and cause it to be mildewed or blasted.

Willich's "Encyclopedia" observes, "Common wheat is more subject to this destructive disease than that which is bearded, *especially if the land has been newly dunged.*" Other writers, likewise, attribute this disorder to the application of fresh dung, in too great quantity.

The remedies against rust or mildew, according to Sir John Sinclair, are as follows: 1. Cultivating hardy sorts of wheat 2. Early sowing. 3. Raising early varieties. 4. Thick sowing. 5. Changes of seed. 6. Consolidating the soil 7. Using saline manures. 8. Improving the course of crops, and, 9. Extirpating all plants that are receptacles of rust. 10. Protecting the wheat plants by rye, tares, and other crops.

Very able and instructive Essays on the Culture of Wheat, by the Rev. Henry Colman, were published in "The New England Farmer," Vol. XII. pages 25, 49, 57, 65, 73. Mr. Colman gives in detail many experiments, some of which were made by himself. He states, in substance, that he sowed three acres of winter wheat on some of the best land in the Deerfield (Mass.) meadows. The land was green sward, turned up in the fall, rolled and harrowed, and the seed soaked in brine, limed, and sowed at the rate of two and a half bushels to the acre, on the 27th of October. One half the field was abundantly manured, and to the other no manure was applied. The seed came up finely, and nothing could exceed the beauty and luxuriance of the growth, a greater part of the field averaging more than five feet in height.

"Above half the field," says Mr. Colman, "including an equal portion of the manured and that not manured, was passed over twice in the spring, after the grain had got to be six inches in height, with a light harrow drawn by one yoke of oxen; and three weeks after was subjected to the same process, according to the method practised in France. The effect of this was to destroy very few of the plants, and to render the growth of what remained much more luxuriant, producing such an increase of the stem and such an extension of the heads, as to attract the notice of the most casual observer, and to induce several persons, who were ignorant of the process to which it had been subjected, to inquire for the cause of the difference in the two parts of the field, and to ask if a different kind of seed had been used. After all, however, to my extreme disappointment, the whole field has been blasted, and I shall hardly get back the amount of the seed sown, and that in a small shrivelled grain. The crop is housed, but will scarcely repay the expense of threshing. Now that this result was not owing to the use of stable dung is obvious, because none was used; and in that part of the field where the blight appeared to commence, and to make most rapid progress, no manure whatever was used. It was not owing to the want of the specific property in the soil, as far as that is to be found in lime and slaughter-house manure, for both of these were employed; the seed was limed, and the above manure copiously applied. It is not to be attributed to the luxuriance of the crop, for several pieces, as I learn in my neighbourhood, have suffered equally and from the same cause, when the cultivation was by no means so high. It is not a time of universal failure, for a good deal in this vicinity is perfectly healthy and sound, and I have already reaped on the same farm a small piece of wheat, say half an acre, on higher land, which was healthy and fair, though from the condition of the land it gave but a small product. This, however, though sowed at the same time, was ready for the sickle more than a week sooner than the other, from the drier and poorer quality of the soil. What then was the cause of the blast? I will not assume to decide this question, but as far as appears, it was atmospheric, occurring at a particular state of the plant, which rendered it peculiarly liable to blight. As the wheat was filling fast, we had frequent showers, and much of what we Yankees call *muggy* weather; one day in particular the air was sultry, the heat intense, and the showers frequent, with intervals of sunshine, and the earth was steaming most profusely. An intelligent farmer in my employ, accustomed to the cultivation of this grain in one of the best wheat districts in New York, remarked to me, that this was very severe weather for my wheat, and that he feared I should lose it. The rust in fact appeared for the first time the next day, and rapidly extended itself over the whole field, presenting no difference either in the manured or in the parts of the field not manured, and of course less luxuriant. Had my wheat been sown earlier, so as to have been farther advanced, it would probably have escaped the blight; had it been sown later, so as not to have been so far advanced as it was, perhaps I should have been as fortunate; but the occurrence of such a peculiar state of the atmosphere being wholly accidental, at least as far as we are concerned, it is impossible to make any certain calculation about it."

Mr. Colman quotes authorities, to show that wet and warm weather, when the kernel was beginning to form, had usually been accompanied with mildew in wheat, in Great Britain. He states, in substance, that the crops of wheat, both summer and winter, have been in this vicinity good and abundant, and on an average full twenty bushels to the acre. In Northfield, Mass. the crops of 1833 rated as high as seven thousand bushels.

Mr. Colman states, that William Pomroy, of Northfield, from twenty-three acres of old meadow land, on the banks of the Connecticut, harvested more than five hundred bushels of winter and spring wheat, "of as fine a sample as ever floated on the Erie canal. A part of it was reckoned to yield full thirty bushels to the acre." Most of this wheat was sowed very early, and was too forward to be injured by the sultry and foggy weather of July. One piece, however, was blighted in consequence of late sowing.

Mr. Colman says: "Early sowing, from the best observation I have made of the wheat crops which have come under my notice, from the united and decided opinion of the British wheat growers, and from many American authorities, is to be strongly advised. The reason is obvious: the wheat crop should be as far advanced in the spring as possible, that it may perfect its seed before the hot and sultry weather usual in July."

Sir John Sinclair says, "If a field be evidently affected [with mildew] and the progress of vegetation stopped, the only way to preserve the straw and the grain, if any has been formed, from being entirely lost, is to cut it down immediately, even though the crop should not be ripe. The straw is thus preserved, either for food or litter, and it is maintained that any nourishment in the stem will pass into and feed the grain, and make a greater return than could well be expected."

Black Sea Wheat. Payson Williams, Esq., of Fitchburg, Massachusetts, has introduced into this country a new kind of wheat with the above appellation, which he has thus described in a communication published in "The Northern Farmer."

"The wheat I not only consider as a remarkable crop in quantity, fifty-five bushels and three quarters, (it being *spring* wheat,) but very excellent in quality. Its history, so far as I am able, shall be given. Three years since, my brother, Captain Stephen Williams, brought me one bushel from Smyrna, which he obtained from a ship while discharging a cargo of that kind of grain from the abundant shores of the Black sea; hence its name. Observing by the map that we were in about the same latitude, I made trial the first season of but one peck, (not being certain that it was spring wheat.) The product was large in *straw;* but owing to our unpropitious storms and bad weather for a wheat crop, the kernel was not so fair as the original. Nothing discouraged, however, I sowed from this product rather than the *original;* the product from which more than answered my expectation. From this last product I sowed, the 19th of April, two bushels and a quarter on one acre of land which had potatoes grown on it the previous year (crop, six hundred and thirteen bushels and a half.) This field, immediately previous to sowing, had been ploughed *deep* and *fine.* After the grain was harrowed in across the furrows, the field was rolled in, and left from that time to putting in the sickle. I would here observe, however, that my usual custom has been, to sow on about twenty bushels of good unleached wood ashes to the acre, so soon as the wheat plants are two inches in height, and in a *damp* morning, if such can be had. The value of such dressing I have considered to consist, 1st, in the caustic quality of the ashes, as it is a preventive to the ravages of the white maggot which sometimes preys at the roots of the young plants; 2d, considered as a manure or top-dressing, it no doubt contributes to the *earlier* perfecting the kernel or berry, and at the same time to a more vigorous growth of the straw.

"The seed was prepared as usual, by stirring into the heap thick whitewash made from quicklime, until every kernel received a coat of the same; say one quart of unslacked lime to each bushel of wheat. I prefer lime to lye made of wood ashes, [only,] on account of its whiteness, thereby rendering it easier to throw the seed (broad-cast) more evenly on the field.

"The character of the soil is a deep loam, intermixed with cobble stones. Its natural forest growth had been oak, (white and red,) beech, rock maple, chestnut, and hemlock.

"The character of the wheat appears to differ from our usual kinds, by the straw being much taller; (some of which was five feet ten inches in height;) and although it is what we call bearded, and the heads of two varieties, similar in appearance to our red and white, yet there is a variety, (say a sixth part perhaps,) which, notwithstanding the head is short, yet the kernels are so closely set that I have repeatedly counted over eighty kernels from one ear or head. This variety I call the *pearl*, from its clear appearance. The kernel throughout the crop was very plump and large; the straw stout as well as tall, bearing the beating of our New England storms better than any I have heretofore grown. I have not the least doubt but it will succeed well, where other varieties have prospered, and have no hesitation in believing it will be a valuable acquisition for many years to come to the agricultural interests of our country."

RYE. The farmer who has it in his power to drive his business, instead of being driven by it, will do well to sow his winter rye some time between the middle of August and the middle of September. If it be sowed so early, it will be less apt to winter-kill, will require less seed, the growth will be stouter, and the produce greater, other things being equal, than if the sowing was deferred till late in autumn.

Some foreign writers on agriculture assure us, that winter rye and spring rye are of the same species; and, "The Farmer's Assistant," says "There is but one kind of rye; but this may be made winter rye or spring rye, by gradually habituating it to different times of sowing. Take winter rye, for instance, and sow it later and later each fall, and it may at length be sown in the spring, and become spring rye. On the contrary, sow spring rye very late in the fall at first, and you may gradually sow it earlier each year, until it may be sown in May, and used the first season for pasture or mowing, and then grown to perfection the second year." The same opinion is likewise expressed in Deane's "New England Farmer."

Rye is capable of being cultivated on most kinds of land, but the light sandy soils, where wheat will not thrive, are the sorts of soil on which it will, generally speaking, be found most profitable to raise this kind of produce. Sir John Sinclair observes, that "this species of grain is not so extensively cultivated in Scotland as it ought to be; (for weighty crops of it might be raised on soils of the most porous and arid nature, and upon almost pure sand along the seashore;) and the winter sort, without which the people living on the coasts of the Baltic could hardly be subsisted, is almost unknown. Thirty-five bushels of rye were raised upon an acre, on land that would not have produced twenty bushels of oats. Indeed, oats sown along side of the rye, upon the same field, and on land as nearly as could be judged of the same quality, were scarcely worth the expense of reaping. On moorish land, rye has been found a more certain crop than oats. Mr. George Culley remarks, that rye, like oats, will answer in crude soils without lime, or calcareous manures, which renders that crop peculiarly calculated for waste lands when first brought into cultivation."

Lands which will produce tolerable crops of wheat hàd better be cultivated for the purpose of raising wheat than rye. And, if we may believe what English writers tell us relative to this subject, the use of lime for manure will often so far change the nature of a poor soil, proper only for rye, that wheat may be made its substitute. Mr. Marshall, in his "Rural Economy of Yorkshire," says, "Before the use of lime was prevalent, much rye was grown on the lighter lands upon the margin of the Vale, and in the Moorlands scarcely any other crops than rye and oats were attempted. Now, rye is principally confined to the Moorland dales; and even there the alteration of soils by lime has been such that wheat has become the more prevalent crop. Nevertheless, on light, sandy soils, rye is generally more profitable than wheat, and the bread which is made from a mixture of the two grains is here esteemed more wholesome to people in general than that which is made from wheat alone."

When rye is sown upon light land it ripens much earlier than on a cold, stiff ground, and it is said by some writers that, by continuing to sow on such a soil for two or three years, it will be forwarded so much as to ripen a month earlier than that which has been raised upon strong, cold ground. For this reason, those who sow their rye late will do well to provide themselves with this early seed.

Dr. Elliot informs, that if rye be sowed successively every year upon the same land, both the crop and the land will be greatly improved, insomuch that some grounds, which would yield but five bushels to the acre at first, have in time produced a crop of fifteen bushels, without the charge of manure; and Dr. Deane observed, that he "had known the same spot produce twenty crops of this grain in succession, excepting that it was planted with Indian corn once or twice, to subdue the weeds, and that the crops yearly increased instead of diminishing." But this, it is said, will not be the case, unless the soil is naturally of a good quality, and the stubble be completely turned under, immediately after reaping. If the ground is suffered to remain after harvest without being ploughed till the stubble is dried and shrivelled so that it possesses but little substance, and the seeds of weeds have had time to ripen, the crops of grain in each succeeding year will be diminished, and the weeds will take an almost exclusive possession of the soil.

"The Farmer's Assistant" is opposed to the raising of successive crops of rye, unless as much as twenty-five bushels of this grain can be yearly had from the acre; as such an annual product would probably afford a clear profit to the acre of half that number of bushels; and such a profit, he observes, in some of the lighter and in some of the harder kinds of soil is not to be despised. The same writer recommends sowing winter rye and spring rye, alternately, in order that the ground might, every other year, be enriched by the application of gypsum. "The growing crop of rye," he says, "receives no benefit from the application of this manure; but it quickly covers the ground with a fine sward of white clover; and as soon as the ground is thus swarded, it is in good condition for bearing any crop. Let the gypsum, therefore, be sown in the spring, on the growing crop of winter rye, and by the middle of October following the ground will be covered with white clover; turn this sward over in the latter end of the fall, and in the spring sow a crop of spring rye; and, as soon as this is taken off, turn the ground over again for a crop of winter rye; and in the spring repeat the process of manuring with gypsum, as before, for a crop of spring rye; and thus proceed with these crops alternately."

Some sow their winter rye at the last hoeing of Indian corn, and hoe it in; and this, Dr. Deane observed, was a good practice, when it is sown on flat land, or on a rich or heavy soil, where grain is apt to suffer by the frost of winter; for the plants of rye will be mostly on the corn hills, and so escape injury from frost; at least they will most commonly escape, or so many of them as are necessary to give a good crop. The plants that are killed will be those in the low spaces betwixt the hills.

Rye is not only a proper crop on land which is too poor to produce a good crop of wheat, but it should be sown on a soil which is *very rich*, in preference to wheat, because it is less apt to grow so rank as to lodge or blast than wheat. It is a very suitable crop for drained bogs. In the first volume of "Communications to the British Board of Agriculture," (p. 341,) in speaking of the culture of rye in Russia, it is observed, that the produce from boggy lands drained and sowed with rye is upwards of forty bushels to one sowed; and they generally use a much smaller quantity of seed in sowing such lands. Another proof that rye will bear very plentiful manuring, may be adduced from a case reported by Mr. L'Hommedieu, of New York; who observed, in substance, that a neighbour of his manured twenty square rods of poor, gravelly, dry soil, with four thousand Menhaden fish, and sowed it with rye, at the rate of about one bushel to the acre. In the spring it was twice successively eaten off, close to the ground, by sheep breaking in, after it had acquired a height of nine inches the first time, and six inches the latter. These croppings, however, only served to make it grow thicker and stronger than before; and when harvested it produced sixteen bushels, or at the rate of one hundred and twenty-eight bushels to the acre; giving to the owner, according to the calculation of Mr. L'Hommedieu, at the rate of eighty-five dollars to the acre of clear profit.*

In the "Memoirs of the New York Board of Agriculture," (Vol. I. p. 82,) it is said, "Rye should be sowed the last week in August, or the first week in September, at the rate of about thirty-six quarts per acre; some say forty-eight quarts. But if it is not sowed at that time it may not come up until spring. A Worthington had a good crop, which he sowed in a January snow storm. Rye raised on upland makes much better flour than that which is raised on low or damp land."

Rye may be sown in autumn to great advantage for green fodder for cattle and sheep, particularly the latter, in the spring. Ewes and lambs will derive much benefit from it, at a time when little or no other green feed can be procured

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* Transactions of the New York Agricultural Society, part 3, pp. 35, 36.— This account may seem incredible, but Mr. L'Hommedieu declared that it was attested to by many credible witnesses.

When it is meant for this purpose, it should not only be sowed early in autumn, but should be sowed thicker than when it is intended to stand for a crop of seed. Some say that it may well be mowed for hay two or three times in the course of the summer; and this piece of husbandry is recommended for farmers whose lands are mostly dry or unsuitable for grass.

The quantity of seed to be sown on an acre should vary according to the soil, the time of sowing, and the purposes for which it is intended. If it be sowed in the latter part of August, or beginning of September, and is intended to remain for a seed crop, the quantity should vary from thirty two to forty-eight quarts, according to the goodness of soil. Later sowing requires more seed, and in some cases two bushels to an acre will not be too great a quantity. Bannister's Husbandry says, "When this grain is sown for sheep feed, it is proper to allow three bushels to the acre, for where the blade, haulm, or stalks form the primary object, a much larger proportion of seed is requisite than when the crop is meant for harvesting."

Mr. Adams Knight, of Newbury, Massachusetts, received a premium of twenty dollars, from the Massachusetts Agricultural Society, for a crop of rye, obtained as follows:

"The soil is a gravelly loam, rather dry than otherwise. The land was planted with corn in the spring of 1831, and manured in the hills with about six cords of manure to the acre, of common quality. In the month of August following, said acre was sowed with three pecks of seed, and hoed in the usual manner. In the month of August, 1832, the rye was reaped and threshed, and found to measure forty-five bushels and five-eighths of a bushel. There is standing on said acre of land seventy-five appletrees, from two to six inches through at the root."*

The same year Mr. Gideon Foster, of Charlestown, Massachusetts, obtained thirty-eight and one-sixteenth bushels of rye from one acre, as follows:

"The land is bordering on, and near the mouth of Mystic river. The soil is principally a black loam, with clay bottom. In 1831 it was planted with potatoes, with a moderate supply of manure, and yielded an ordinary crop. The potatoes were removed the last week in September, the land well ploughed and harrowed in the usual way, with one and a half bushels of seed to the acre. I owe my success principally to the use of night manure, and to that in consequence of its being well prepared by age, and thoroughly mixed with a large proportion of earth, and frequently removed by the fork and the shovel; so that in this way, being ripened for use, it went immediately (not to burn, as when applied green or new, but) to nourish and fertilize the soil. There was early in the spring of the present year spread on the field about eight cords of the above described manure. The field was harvested the latter part of August, the grain threshed soon after, and measured by the purchaser, whose certificate followed, showing the product to be sixty-one and three-fourths bushels, or thirty-eight bushels and two quarts to the acre."*

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* New England Farmer, Vol. XI. p. 288.

The following is from the "Transactions of the Essex Agricultural Society."

"*To the Trustees of the Essex Agricultural Society.*

"GENTLEMEN,—Having for many years past been more than commonly successful in raising large crops of winter rye by a process of cultivation which, I believe, is entirely new, I have been induced to submit a statement of the mode of culture, with the produce. And, that the success of the experiment this season may not appear to be altogether accidental, it will, perhaps, be as well to communicate the result of the process for the three or four previous years.

"The land on which the experiment has been conducted is situated on the Merrimack, about a mile and a half east of Haverhill bridge; and came into possession of my father in 1827. The soil is a sand, approaching to loam as it recedes from the river. Perhaps the term *plain land* (by which it usually passes) will better convey an idea of the quality of the soil. It is altogether too light for grass. The crops we find most profitable to cultivate on it, are winter rye, Indian corn, potatoes, and to some extent turnips. Oats might probably be raised to advantage, were it not that the land is completely filled with the weed commonly called charlock, which renders it entirely unfit for any spring crop, excepting such as can be hoed. The crops of rye on the neighbouring soil of the same nature vary, I believe, from seven or eight to twelve or thirteen bushels per acre, according to the cultivation, and their approximation to the river. We usually raise on this land from thirteen to thirty bushels of Indian corn per acre. Potatoes are very good in quality, but the quantity is quite small; not sufficient to be profitable, were it not that the land is very easily cultivated.

"In the summer of 1827, we sowed three bushels of winter rye near the river, on about two acres of land, which produced twenty-eight bushels.

"In 1828, we sowed four bushels on four acres of land running the whole extent of the plain from the river. This piece was sowed in the spring with oats; but they were completely smothered with charlock, and about the middle of June, the whole crop was mowed to prevent the charlock seeding. By about the middle of August, a second crop of charlock having covered the land, it was ploughed very carefully, in order completely to bury the charlock; and then suffered to remain until the 15th of September, when we began sowing the rye in the following manner. A strip of land about twelve yards wide was ploughed very evenly, to prevent deep gutters between the furrows, and the seed immediately sown upon the furrow and harrowed in; then another strip of the same width, and so on, until the whole was finished. We found the oat stubble and charlock entirely rotted, and the land appeared as if it had been well manured, though none had been applied to this part since it had been in our possession. The rye sprung very quick and vigorously, having evidently derived great benefit from being sown and sprouted before the moisture supplied by the decaying vegetable matter in the soil had evaporated to any considerable extent. This crop produced one hundred and thirty-three bushels.

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* New England Farmer, Vol. XI. p. 243.

"In 1829, the charlock was suffered to grow on the land appropriated to rye, until it had attained its growth and was in full blossom. The land was then ploughed very carefully, and the charlock completely covered in. In a short time a second crop appeared, more vigorous than the first. This also was allowed to attain its growth, and then ploughed in as before. A third crop soon appeared, which of course was destroyed, when the land was again ploughed for sowing, about the middle of September. This piece of land was a parallel strip running from the river, and containing two acres. Two bushels of rye were sowed. The crop presented a remarkably promising appearance, and yielded seventy-four and a half bushels.

"In 1830, the land appropriated to rye included nearly all the lighter part of the soil, and owing to a pressure of business was not attended to as we could have wished. It was ploughed in the early part of the summer; but harrowing to destroy the weeds was substituted for the second ploughing. This, and the unusual blight which affected all the grain in this part of the country, led us to anticipate a small crop. It yielded, however, fifteen bushels to the acre.

"The land on which the crop of rye was raised the present season had for three or four previous years been planted with Indian corn; and owing to the extent of our tillage land, we have not been able to apply more than four or five loads of manure to the acre this season. The charlock was suffered to attain its growth as usual; and on the 18th and 19th of June it was carefully ploughed in. The second crop was ploughed in on the 6th and 7th of August. On the 14th and 15th of September it was sowed in the usual manner, namely, a small strip of land was ploughed, and the seed sown immediately upon the furrow, and then harrowed in; then another strip of land was ploughed, and so on, until the whole was completed. One bushel per acre was sowed, as usual. The seed was originally obtained from a farmer in this vicinity, and I suppose is similar to that which is generally used. We have never prepared our seed in any manner, but have directed our attention solely to the preparation of the land; and to this we attribute our success. Owing to the unusual severity of the winter, the crop was considerably winter-killed, but recovered very soon in the spring, excepting in the midfurrows. There, as the land lies very level, the water settled, and so completely destroyed the rye that they continued bare the whole season. This would of course cause some diminution in the crop; perhaps a bushel or two. The rye was reaped at the usual season, and, as the weather was favorable, immediately put into the barn. The land contained one acre and thirteen rods, and yielded *forty-six bushels and three pecks: a remarkably fine sample.*

"Sowing the seed immediately after the plough we consider very advantageous to the crop. The soil being then moist, causes the seed to spring immediately, and gives a forwardness and vigor to the plants, which they ever after retain

"The process of ploughing in *three* crops of weeds, before the seed is sown, very much enriches the soil. It would be altogether unnecessary to attempt to refute the notion, that by such a process nothing more is applied to the soil than was before derived from it. If one could not discover by the light which chemistry has shed upon the subject of agriculture sufficient *reasons* for the contrary conclusion, observation, one would think, would be sufficient to convince any intelligent man of the fact.

"And here I would suggest, that I do not consider the experiment, as we have conducted it, quite complete. To render it more so, in the first place, in ploughing in the weeds, I would not turn a furrow after the dew had evaporated I have no doubt but that a large portion of that fertilizing quality in the soil, which (during the summer months) is continually exhaled from the earth, is by the dew brought again within our reach, and it would be wise to avail ourselves of the opportunity of again burying it in the soil. And in the second place, I would by all means use a heavy roller after each ploughing. It would fill all the cavities left by the plough, and by pressing the soil more closely to the weeds, at once hasten their decomposition and very much retard the evaporation from the soil.

"But the land is not only very much enriched by this process. There is, I conceive, no method by which it can be so effectually cleaned. Three times during the season a fresh surface is presented to the atmosphere; and each time, as the decaying vegetable matter increases in the soil, so is the exciting cause augmented to make a more vigorous effort. We have in this manner gone over nearly all our land which is infested with charlock, and the diminution of the weeds is quite sufficient to warrant the expectation, that in a few years it may be comparatively eradicated.

"Very respectfully, JOHN KEELY.

"Haverhill, September 22, 1832."

OATS. The following remarks are extracted from a communication for the "New England Farmer," written by Henry Stevens, of Barnet, Vt.:

"Various are the kinds of oats. The barley or Scotch oats, so called, I have cultivated, but not with very great success; their weight is generally about forty-two pounds per bushel. I have seldom been able to raise more than from twenty to twenty-five bushels per acre. The black oats I have cultivated; their weight is about thirty-six pounds per bushel, and produce about as many bushels per acre as the barley or Scotch oats. The greatest objection I have to the barley or Scotch oats is, that they must be harvested suddenly after they are fit, in order to prevent waste. The common oats which are raised I consider preferable. My average crop of late years has been from forty to fifty bushels per acre, and in one instance sixty-five bushels per acre.

"I make oats principally, and generally speaking, my first crop, in the line of a rotation of crops. I break up the piece intended for this crop in the fall, if possible, and in the spring cross-plough and harrow thoroughly before I sow my grain; then harrow again until the turf is well pulverized; then sow ten bushels of clover-seed chaff per acre, and roll it in. As soon as the grain is harvested, and the young clover has received its growth, I plough it in. This clover with the stubble is about equal to a common dressing of compost manure In the fall, plough, in the spring I cross-plough, after taking from my compost heap thirty loads per acre, which are carefully spread. The lot then being well harrowed and furrowed, is ready for planting, either with corn, potatoes, or turnips. This is my second crop. For my third crop, I again sow wheat, peas, flax, oats, &c., and stock the lot down with herd's grass and red top, which I believe make the best of hay. I let the lot remain in grass three years. Thus I till three years, or mow or pasture three years. My first and third crop is principally oats.

"I have frequently been told, that oats and corn were very impoverishing crops; but I find no difficulty in enriching my land as above stated. Ten years ago my average crop of corn was from thirty to forty bushels per acre; but in passing over a lot the second time, which was managed as above, in the summer of 1821, I had the satisfaction of harvesting ninety-six bushels of corn per acre, and received the society's premium. My other crops have advanced in about the same proportion.

"The inquiry will naturally be made, what I do with my oats? Well, sir, after I have reserved for my stock and for seed, I take the remainder to my mill and manufacture them into flour and meal. It will be understood that the oats are kiln dried, then hulled about as clean as rice, then ground, and bolted or sifted, as the case may be. That which I bolt is calculated to be mixed with wheat flour, for bread; in which case the oat flour, being kiln dried, must be scalded before it is mixed with the wheat flour, otherwise the bread will be too dry. Good oat flour, prepared as above, mixed with wheat flour, half and half, will make as light and pleasant bread as common country wheat flour, and it will trouble good judges of bread to tell it from clear flour bread. Again, it is excellent to make butter cake, by the Yankees called slapjacks. The oatmeal is calculated for puddings, and is a substitute for rye meal to mix with corn meal or rye meal for bread. In either case, the oatmeal must be scalded before it is mixed.

"Thus after supplying my family, the remainder is for market. The oat flour I have generally sold in Boston and New York to the druggists. The meal is also purchased by the druggists. I have generally sold them oat flour for from four to five dollars per hundred, and the meal from three fifty to four fifty, which is by them retailed as medicine, from twelve to twenty cents per pound.

"The meal is frequently bought by foreigners, by the barrel or hundred, for family use. The sale of oatmeal is at present rather limited; the reason is, that but very few people in this country, save foreigners, are acquainted with the use of it, except for medicine. Foreigners generally prefer oatmeal to flour. I really hope, both for our health and the interest of agriculture, that the time is not far distant, when oat flour and meal will be used in every family for food.

"Much may be said, as to the value of this article as medicine, as well as for food. It has been a common article for food in Scotland and Ireland for many years. Seldom, if ever, an English, Scotch, or Irish vessel sailed without a supply of oatmeal; and I may say, it would be well for every commander of an American vessel, in making up his order for ship stores, to include a sufficient quantity of oatmeal or flour for his voyage."

A writer in "The Massachusetts Agricultural Repository," (Vol. V. pp. 331–2,) says, "It appears to us best, all things considered, that the first crop, after turning over sward, should be oats. The reason why an oat crop should precede a potatoe crop is, that it not only pays well by its product for the year's labor, but enables the husbandman to deepen his ploughing, preparatory to the second year's series in the rotation."

We believe that oatmeal is of more value as an article of diet than is generally supposed in this country. Loudon, in his "Encyclopedia of Agriculture," observes, that

"Oatmeal, when it is sufficiently diluted with any sort of liquid, is known to be laxative, aperient, wholesome, and at the same time a strengthening food for those engaged in hard labor. Engineers who superintend the excavation of canals have assured the reporter, that those laborers who lived entirely on oatmeal and milk, did a third more work than those who used butcher's meat and ardent spirits. All of the former saved money, while many of the latter involved themselves in debt. As this sort of work is done by the piece, it affords a fair comparison not only of the wholesomeness of oatmeal in promoting health, but its power in supplying labor."

In harvesting oats, it is recommended to mow, instead of reaping them, as soon as they begin to turn yellow. If they are then well dried, the straw will make food for cattle, after being threshed, which will be eaten by the animals in preference to the best meadow hay.

Mr. Jacob Smith, of Duxbury, Massachusetts, is said to have raised, in 1833, the prodigious crop of *seventy-four bushels and three pecks of oats on four-fifths of an acre.* The average height of the plants at the time of harvest was estimated at five feet four inches.

BARLEY. The following is from the pen of judge Buel, of Albany.

"*The soil* for barley should be such as will grow good turnips, or other green crops, including clovers, and which embrace the varieties of loams and sands that are not wet, or *very* dry and poor. Indeed, I have taken my crops, and they have been pretty good, from my lightest turnip soils. Barley cannot be cultivated to advantage upon stiff, heavy, and wet grounds, or on such as are of a cold and tenacious quality. This crop occupies the ground but about three months; and it is only in a dry, light, mellow soil, that its roots can extend with sufficient facility, and supply the food necessary to bring the grain to rapid and perfect maturity.

"*Previous Crop.* Crops that precede this grain should be such as leave the ground mellow and free from weeds; and for this reason hoed crops are to be preferred, such as turnips, potatoes, peas, beans, &c. Small grains should not precede it ; they impoverish the soil, leave it foul, and, besides, it is contravening one of the most salutary maxims of husbandry to grow two dry crops in succession. It may follow clover; but if the soil is heavy, the ley should be ploughed in autumn. Barley is successfully sown upon the fallows in England, (not summer, but autumn fallows,) and is sown sometimes after wheat ; but in the latter case the turnips are pulled, and previously fed upon the stubble; a practice which I think is not likely to obtain here. I have generally sown barley after ruta baga or potatoes, these crops having received a good dressing of long yard or stable manure.

"*Manure* should not be applied to the barley, but to the preceding crop. The short period that this grain occupies the ground, does not afford time for the manure to decompose and yield its food to the plants; and, if applied in excess, it causes a too rank vegetation, and the straw lodges before the grain is matured. When a fallow or clover ley is employed and ploughed in autumn, dung may be previously employed and ploughed under.

"*Preparation of the Ground.* Where barley follows a root or hoed crop, one ploughing will generally suffice; but in all cases a complete pulverization of the soil is necessary; and to effect this a roller is often of material benefit. If sown upon grass leys, ploughed in autumn, the spring ploughing should be shallow, so as to leave the sod reversed But the preferable way may be to harrow the fallow, plough in the seed with a light furrow, and smooth off with the harrow.

"*The Seed and Sowing.* Loudon enumerates six species and sub-species of the barley. The kinds uniformly cultivated here, are the two, four, and six-rowed spring, (*hordeum vulgare* and *hordeum distichon.*) Thin-skinned, pale, plump seed should be selected. I sow as soon as the ground is sufficiently dry in spring. The young grain is not hurt by the ordinary frosts of the latter part of April and May. I sow from six to eight pecks per acre, according to the richness of the soil and the forwardness of the season; the poorest ground and the latest sowing requiring the most seed In England, the common quantity of seed is from eight to sixteen pecks. Our climate being much warmer than that of Great Britain, barley and other grains till better with us, and consequently we require less seed. We uniformly sow broad-cast, generally on the fresh furrow, and harrow in both ways; and those who have a roller use it in the finishing operation. It gives a smooth surface, breaks down the lumps, brings the earth in contact with the seed, and if grass seeds have been sown, its use is doubly beneficial. I steep my seeds twenty-four hours in a weak solution of nitre, the crude kind of which costs me only eight cents per pound by the quantity. From the analysis and observations of Grisenthwaite, there is reason to believe that this salt is peculiarly beneficial to the barley crop, the grain yielding it on analysis. I have made no comparative experiments, but I think this step serviceable. I have applied to this grain, as a top-dressing, with singular success, the powdered dung of pigeons and dunghill fowls, at the rate of twenty to thirty bushels the acre.

"The crop admits of no after-culture when sown broadcast. Yet the application of the roller, when the plants are two or three inches high, is no doubt salutary, especially if there have been no considerable rains. Rolling gives a salutary compression to the soil, which in the spring is apt to be loose and porous, and full of cracks, by the alternation of freezing and thawing, or of wet and dry weather; it destroys many insects; and, above all, it partially buries the crowns of the plants, and introduces a multiplication of seed stalks. I can recommend the practice from experience. When grass seeds are sown with barley, the luxuriance of the young grass sometimes chokes the grain, robs it of nutriment, and sensibly diminishes the product. To obviate this evil it has been recommended to sow the grass seeds after the barley has come up, and to cover them with a light harrow and a roller; and it is said, and I think with truth, that this operation will not materially injure the grain. In dry seasons, the crop is sometimes attacked by worms while young. In this case the roller should be applied and sufficient weight added to require the draught of two or three cattle.

"*Time and Method of Harvesting.* When the soil is rich and the season propitious, this grain is very liable to lodge. If this happens after it has blossomed, no material injury is sustained in the product; if before, the crop is greatly diminished. This shows the danger to be apprehended from making the soil too rich, and of applying fresh manure. Barley is known to be ripe by the disappearance of the reddish cast on the ear, or what the English farmers term *red roan;* by the ears beginning to droop, and bending themselves round against the stems; and by the stalks becoming brittle, and of a yellowish color. This is the particular period for cutting, as, if suffered to stand longer, the heads break off, and the grain wastes with the slightest touch. And it may be cut with the cradle, sickle, or scythe, according to circumstances. If it stands straight, and is not too heavy, the cradle is to be preferred; if heavy, or lodged, the sickle or scythe. But as the grain is yet soft, and the straw contains much moisture when it ought to be cut, it should be suffered to become well dried in the swath before it is bound in sheaves, or carried to the barn or stack. If cut with the cradle or sickle, it is bound in sheaves; but the more common practice is to cut the crop with the scythe, rake the ground, and load it with the barley fork.

"Barley improves for malting by lying till October before it is threshed; though it is often threshed immediately from the field. The great difficulty in preparing it for market is, to rid it of the awns. This may be done with flails, after it has passed once through the fanning mill; and, where it is in great quantities, it may be spread from four to six inches upon the barn floor, and trodden with horses

"*Produce ana Profits.* The average product in England is stated by Donaldson at thirty-two bushels per acre. The product in New York varies from fifteen to seventy bushels, according to season and soil; and I think the average is somewhat short of that of Great Britain. Compared with wheat, its product is as two or two and a half to one; compared with oats, about equal, provided the soil is adapted to this grain. It is, however, to be remembered, that neither wheat nor oats are adapted to a barley soil; the first requiring a more stiff and tenacious, and the latter a more cold and moist location. The average price of barley is at least two-thirds that of wheat. Supposing wheat, then, to be one dollar and twelve cents the bushel, and the product fifteen bushels per acre, and barley to be seventy-five cents, and the product of an acre thirty bushels, and the expense of cultivation equal, the profits of the barley will be nearly as three to two compared to wheat. Barley, besides, is a less precarious crop, is subject to fewer diseases, and has fewer insect enemies to encounter than wheat."

A correspondent of the Bath Agricultural Society writes, "The last spring being remarkably dry, I soaked my seed barley in the black water taken from a reservoir, which constantly receives the draining of my dung heap and stables. As the light grains floated on the top, I skimmed them off, and let the rest stand twenty-four hours. On taking it from the water, I mixed the grain with a sufficient quantity of sifted wood ashes, to make it spread regularly, and sowed three fields with it. The produce was sixty bushels per acre. I sowed some other fields with the same seed dry, but the crop, like those of my neighbours, was very poor, not more than twenty bushels per acre, and mixed with green corn and weeds, when harvested. I also sowed some of my seed dry on one ridge in each of my fields, but the produce was very poor, in comparison of the other parts of the field"

MILLET. (*Panicum Miliaceum.*) The stalks and leaves of this plant resemble those of Indian corn, though much smaller. It grows to the height of three or four feet. A sandy soil suits it best. It bears drought admirably well. It is said to produce as large a quantity of grain as Indian corn, when cultivated in drills three feet apart and six inches in the rows; but owing to the difficulty in saving the crop, on account of birds, of its ripening unequally, and its shelling out, it is generally thought best to sow it broad-cast, and cut it when in milk for fodder.

Mr. Reeder, of Pennsylvania, sowed one peck to the acre in May, and put in four acres; cut it the middle of August, and dried it in the sun two or three days. He had seventy-five bushels of seed to the acre, and six tons of fodder on four acres. His cattle relished it very well.

It is stated in "The Plough Boy," that millet sowed in June, on good ground, will give from two to four tons of fodder, and from twenty to thirty bushels of seed, equal to corn for fattening hogs. It is cultivated in Pennsylvania and Maryland as a fodder crop, and cut in the milk. It is preferred in winter by neat cattle to clover.

"The American Farmer" gives the following very flattering account of this grain. Millet sown from the 1st of May to the 20th of June has invariably furnished more fodder than could have been obtained from grass under similar circumstances. On the 5th of May, five bushels were sown on four acres; on the 5th of July it was harvested, and estimated at four tons per acre. It requires in all cases fine tilth, and as much strength of soil as is necessary to produce heavy oats.

A crop of fodder can be produced if sowed as late as the last of July.

Mr. N. Davenport, of Milton, Massachusetts, gives the following account of growing a crop of millet:

"From the 10th to the 23d of June, I sowed about twelve acres of millet, at about sixteen quarts per acre. About one-third was on land planted the year before, and I think produced nearly three tons per acre; the other two-thirds was on green sward, ploughed and harrowed but a few days before being sown; and on very light land, without any manure on either. I had not much over one ton per acre on the green sward, the land being so light that it did not bear more than two or three hundred of hay per acre. I mowed my millet from the 1st to the 12th of September; and I found the tops of heads perfectly ripe and fit for seed."

John Hare Powell, Esq., of Pennsylvania, has given us the following observations on the culture of this crop:

"I have made many experiments on various soils, and at different seasons, to ascertain the product as well as the properties of millet. Upon light land, in good condition, it succeeds best. It requires in all cases fine tilth, and as much strength of soil as is necessary to produce heavy oats. I have not seen, either in Europe or America, any green crop which so largely rewards accurate tillage and plentiful supplies of manure, as the species of millet usually grown in this and the adjacent counties. I have sown it from the 1st of May to the 20th of June, and have invariably obtained more fodder than could have been had from any grass, under similar circumstances. In the autumn, eighty bushels of *caustic* lime per acre were strewed upon an old sward, which was *immediately* ploughed, closely harrowed, sown with rye, and rolled. The rye was depastured in the winter and succeeding spring. Early in April the land was ploughed again; the lime and decomposed vegetable matter was thus returned to the surface. About three weeks after, it was harrowed, to destroy weeds; early in May it was again harrowed for the same purpose; within a fortnight it was stirred with Beatson's scarifier to the depth of nine inches, harrowed, sown with millet, and rolled. The crop was fairly estimated at three tons per acre. After the millet was cut, the field was stirred, and repeatedly harrowed, to destroy the after growth of noxious plants. I intend to again sow rye, not only to obtain pasturage, but to protect the soil from the exhalations of the sun. In the succeeding spring, a slight dressing of fresh manure was ploughed under; the scarifier, roller, and harrow, were used at intervals as before. On the 5th of May, five bushels of millet seeds were sown on four acres; on the 5th of July the crop was hauled, and estimated at four tons per acre. I have obtained this season forty tons from sixteen acres, of which four only had been manured; the remainder could not have borne a good wheat crop. One of the loads was weighed; an account of them was regularly kept; their size was made as nearly equal as possible. I have generally used a large quantity of seed, as not more than two-thirds of that which is usually sown will vegetate. Whilst my oxen consumed millet in its green state, they performed their work with more spirit and vigor than they had done before, or have shown since, except when fed with grain. My cattle, of all ages, prefer it to both red and the best white clover, meadow, or timothy hay

"I am not disposed to cultivate it as a farinaceous crop, since I have found great difficulty in protecting it from the ravages of immense flocks of birds, which it attracts, and in securing it sufficiently early to prevent a large part of the grain from being left on the ground. The seeds on the upper parts of the stalks generally ripen and fall before those below have been filled. I therefore invariably cut it when the upper parts of most of the heads contain seeds which are hard. In this stage it affords fodder more nutritious, and more easily made, than any sort of hay. The expense of tilling the land, is not so great as at first view would appear. A yoke of good oxen can scarify three acres and a half, without difficulty, in one day. I would recommend millet, not merely for its value as a food, but for the means it affords of making clean the land, without summer fallows, or drill crops. The ingenious arguments which have been adduced, to prove that deep stirring between growing crops is advantageous to them and the soil, are founded upon English experience, properly directed by close attention to the effects of a moist climate. Some of our writers have profoundly asserted, that as 'dew drops' are found on the under leaves of plants after deep stirring has been given in a time of great drought, the practice is sound. I should suggest, that moisture had better be at such times conveyed to the roots, than be exhaled by the sun, or placed on the leaves until his rays shall have exhausted it all. The valuable parts of most manures readily assume the gaseous form, every deep stirring, to a certain extent, in *hot* weather, therefore, impoverishes the soil. Deep ploughing, at *proper* seasons, is, I conceive, the basis of all good farming. Such crops as shall enable the husbandman to extirpate weeds, and obtain large supplies of fodder, without much exhaustion, should be the great objects for his aim. I would propose that a foul sward receive its proper quantity of quick-lime, which should be spread and ploughed under, in its *caustic* state, in the early part of September; that the field be harrowed sufficiently; sown with rye at the rate of twc bushels per acre, as early as possible; that it be depastured late in the autumn and early in the spring; that in May it be again ploughed, three inches deeper than before; that it be harrowed, and left until the small weeds begin to appear. Early in June millet should be sown; in August the crop can be removed, after the labors of the general harvest The field should be slightly stirred with the scarifier, occasionally harrowed, and left throughout September, for the destruction of weeds, as before. In October it may be manured, and sown with wheat, or left for a crop of Indian corn."

BUCKWHEAT. (*Polygonum.*) In light lands this crop may be raised to advantage. In this climate it should not be sown till after the middle of May. One bushel is seed enough for an acre, if sown broad-cast, as is usual; but if sown in drills, less than half that quantity is sufficient. In the State of New York, farmers sow it in August with winter wheat. It affords them a ripe crop in the fall, without injuring the crop of wheat, which grows with and succeeds it.

Buckwheat is harvested by mowing, in the manner of barley. After it is mown it should be several days before it is housed. It is in no danger of the seeds falling, nor does it suffer much by wet. From its great succulency it is liable to heat in a mow, on which account it is better to put it into small stacks of five or six loads each, than either a large one, or in a barn.

Mr. Loudon observes, "that the use of the grain of buckwheat in Great Britain is almost entirely for feeding poultry, pigeons, and swine. It may also be given to horses, which are said to thrive well upon it; but the author of "The New Farmer's Calendar," says he thinks he has seen it produce a stupefying effect. Young says, that "a bushel of buckwheat goes farther than two bushels of oats, and mixed with at least four times as much bran, will be found sufficient for a horse a week. Eight bushels of buckwheat meal will go as far as twelve bushels of barley meal."

The meal of buckwheat is made into thin cakes, called crumpets, in Italy, and in some parts of England. Buckwheat pancakes are likewise common, and thought to be wholesome as well as palatable, in many parts of the United States. Buckwheat blossoms afford rich food for bees, and are useful as well from the quantity of honey which they enable the bees to make, as the long time they continue without fading or ceasing to be fragrant. On this account the buckwheat plant is highly prized in France and Germany; and Du Hamel advises bee-keepers to carry their hives to fields of this crop in autumn, as well as to heath lands.

"The Farmer's Assistant," says, "We cannot recommend the culture of buckwheat on lands which are suitable for more valuable crops; but on light, smooth lands, particularly, the farmer may find his account in keeping a field of a few acres for a yearly crop of buckwheat, as well for family use as for assisting in fattening his swine, &c. A bushel of gypsum to the acre, or perhaps less, applied yearly to the ground, would be found to keep it rich enough for good crops."

RICE. (*Oriza Sativa.*) This is a genus of plants, consisting of several species, which, however, may be divided into two varieties, viz. mountain rice, which grows in dry, elevated soils, and marsh rice, sown in low swampy districts. The former kind was raised by Mr. Bordley, on dry, sandy land, near Annapolis, in Maryland. It is perhaps possible that this plant may be gradually introduced into the northern States, and made to grow in dry and elevated ground. This is much to be desired, as rice is the cheapest nutriment known, containing, it is said, ninety-six parts in a hundred of nutritive matter.

"The Farmer's Assistant," gives the following directions for the culture of this plant : "Early in the spring, the ground is to be fitted with the plough for the reception of the seed, which is to be drilled in, in rows, at the distance of about twenty-seven inches apart. When the young plants have acquired a suitable height, the weeds are to be eradicated from the crop with the plough, or with a small harrow to be guided by handles behind, run twice between the rows, and the work is then completed by the hoe, and perhaps some hand-weeding.

"In due season after this, the water is to be occasionally let on the ground, for the purpose of killing the weeds and grass; and then to be let off again, in order that the crop may have such farther ploughing and hoeing as may be found necessary. If water is not used, the growing crop is to be kept clear of weeds, like other hoed crops, till the ground becomes sufficiently shaded to prevent farther trouble from them.

"The grain will be found sufficiently ripened while the stalks are still green; and on this account they are valuable as a substitute for hay. If the crop be flooded, the water is to be let off in due season, so that the ground can be laid sufficiently dry before harvesting. With regard to this operation, we will merely observe, that he who understands the manner of harvesting wheat, rye, barley, or oats, need be at no loss as to the best method of gathering this crop; remembering, however, that the straw should be sufficiently dried before threshing or stowing the crop away."

HOPS. The following was written by William Blanchard, Jun. Esq., and first published in "The New England Farmer."

"The hop is a native plant. It is found growing spontaneously on the banks and intervals of many of our large rivers. There are several distinct species, all bearing a near affinity to each other; (I have noticed five.) At present they are cultivated together, promiscuously; no preference having been given to any particular one of them by the brewer.

"The soil best calculated for the production of hops, is a sandy loam, rather low and moist. I am led to this conclusion from my own observation, and from finding the lands which produce them naturally to be of this kind. Yet, I have seen fine crops raised on very different soils.

"I should recommend the following mode of preparing he land and managing the crop. In the fall (October) plough the land deep, nine or ten inches. In the spring following, pass a heavy, sharp, iron-toothed harrow over the land, in the same direction it was ploughed; after which, spread your manure evenly over the same, sixteen cords per acre, and more if the land be much reduced; then cross-plough the land nearly the same depth, and furrow it as for planting corn, the furrows to be at least four feet apart.

"It is customary to plant corn or potatoes with the hops; (I should prefer potatoes.) Plant every other hill in every other row with hops, thus placing the hop hills at least eight feet apart. Put four cuttings from the running roots, about eight inches in length, into each hill, and cover them the common depth of potatoes.

"Many yards have been much injured by being planted too closely. It is of great importance to have the hills so far distant from each other as to admit a free current of air to pass through the yard.

"All the attention requisite the first season after the hops are planted, is to keep them clean from weeds, which is easily done when hoeing the crop planted amongst them. In the fall, (October,) to prevent their being injured by the hard frosts of winter, carry on and lay out of your cart one shovelful of compost manure on the top of each hill; manure from the hogsty I should prefer.

"In each following spring, before the hops are opened, as it is termed, spread evenly over the yard about eight cords of manure per acre, (coarse, strawy manure I should prefer, as it will have a tendency to keep the land loose,) and plough the field both ways at the first hoeing. They require but three hoeings in a season, unless necessary to subdue the weeds; the last of which should be performed when the hops are in full blossom, (about the beginning of August.)

"After the first crop, it is necessary to open the hops, every spring, by the middle of May; which is performed by making four furrows between the rows, turning the furrows from the hills, and running the plough as near to the same as possible without injuring the main roots. Then the earth is removed from the roots with a hoe, all the running roots cut in, with a sharp knife, within two inches of the main roots; the tops of the main roots must also be cut in, and then the hills covered with earth about two inches deep.

"The next thing necessary to be done is to set the poles. This should be done as soon as the hop-vines begin to make their appearance. By so doing, much time and labor will be saved in tying up the vines to the poles, as many of the vines will naturally take to the poles. There should not be to exceed two vines to one pole, nor to exceed two poles to one hill, nor any pole to exceed sixteen feet in height. Many yards have been very much injured by letting a greater number of vines grow on one pole, and almost destroyed by over-poling.

"Very much depends on paying due attention, in the spring, to select the most thrifty vines, and training them to the poles, which is done by fastening them to the poles with a piece of yarn, slightly twisted together with the thumb and finger.

"It will be necessary to inspect your hop-yard frequently, until the hops begin to blossom, and 'tie up the vines,' as it is termed, as they are subject to be blown off the poles by every high wind.

"As soon as the hops are ripe, which is about the beginning of September, they must be immediately gathered, or the crop is lost. The quality of the hops depends considerably on their being picked clean from leaves and stems. The labor of picking or gathering the hops may be well performed by women and children, having one man to a bin to handle the poles and to inspect the pickers. The bin is a wooden box, about nine feet long, three feet wide, and two and a half feet high, made of thin pine boards, that it may be easily moved over the yard, across which the poles are laid, and into which the hops are picked by hand. Care should be taken, when gathering the hops, to cut the vines two feet from the ground, that the roots may not be injured by bleeding.

"The most important part in the management of hops is the curing or drying them. Here I would note, that hops always grow first sort, and that all second sort and refuse hops are made so by unfortunate or unskilful management.

"Much depends on having a well-constructed kiln. For the convenience of putting the hops on the kiln, the side of a hill is generally chosen for its situation. Care should be taken that it be a dry situation. The kiln should be dug out the same bigness at the bottom as at the top; the side walls laid up perpendicularly, and filled in solid with stone, to give it a tunnel form. Twelve feet square at the top, two feet square at the bottom, and at least eight feet deep, is deemed a convenient size. On the top of the walls sills are laid, having joists let into them in like manner as for laying a floor; on which laths, about one and a half inches wide, are nailed, leaving open spaces between them three-fourths of an inch, over which a thin linen cloth is spread and nailed at the edges to the sills. A board about twelve inches wide is set up on each side of the kiln, on the inner edge of the sill, to form a bin to receive the hops. The larger the stones made use of in the construction of the kiln, the better; as it will give a more steady and dense heat. The inside of the kiln should be well plastered with mortar to make it completely air-tight. Charcoal (that made from yellow birch or maple I should prefer) is the only fuel proper to be used in drying hops. The kiln should be well heated before any hops are put on, and carefully attended, to keep a steady and regular heat.

"Fifty pounds of hops, when dried, is the largest quantity that should be dried at one time, on a kiln of this size; and unless absolutely necessary to put on that quantity, a less would dry better. The green hops should be spread as evenly and as light as possible over the kiln. The fire at first should be moderate, but it may be increased as the hops dry and the steam is evaporated.

"Hops should not remain long in the bin or bag after they are picked, as they will very soon heat and become insipid. The hops should *not* be stirred on the kiln until they are completely and fully dried. Then they should be removed from the kiln into a dry room, and laid in a heap, and there remain, unmoved and unstirred, until bagged, which is done with a screw, having a box made of plank, the size the bag is wished, into which the cloth is laid, and the hops screwed into the box, which is so constructed that the sides may be removed, and the bag sewed together while in the press.

"The hops, after laying a few days, will gather a partial moisture, called a sweat. The sweat will probably begin to subside in about eight days, at which time, and before the sweat is off, they ought to be bagged in clear dry weather. As the exact time when the hops will begin to sweat, and when the sweat will begin to subside or dry off, (the proper time to bag them,) will vary with the state of the atmosphere, it will be necessary to examine the hops from day to day, which is easily done by taking some of them from the centre of the heap with your hand. If on examination you find the hops to be very damp, and their color altering, which will be the case if they were not completely dried on the kiln, and not otherwise, you must overhaul them and dry them in the air.

"The most convenient size for a bag of hops, to handle and transport, is about five feet in length, and to contain about two hundred and fifty pounds. The best bagging is coarse, strong tow cloth, of our domestic manufacturing; next to that, Russia hemp bagging. The East India sugar and gunny bags, so called, ought never to be used. The sugar bags are of an unreasonable weight, and both they and the gunny bags are of no value to the brewer; whereas the other bags are worth prime cost.

"It is now common for those who have entered considerably into the cultivation of hops, to build houses over their kilns, which, in wet weather, are very convenient; otherwise, a kiln in the open air would be preferable. It is necessary to have these buildings well ventilated with doors and windows; and to have them kept open night and day, except in wet weather, and then shut those only which are necessary to keep out the rain. If a ventilator was put in the roof of the building, directly over the centre of the kiln, about six feet square, built like those in breweries and distilleries, they would be found very advantageous. I have seen many lots of hops much injured both in color and flavor by being dried in close buildings.

"Where the houses over the kilns are built large, for the purpose of storing the hops as they are dried, which is a great saving of labor, a close partition should be made between the kilns and the room in which the hops are stored, to prevent the damp steam from the kilns coming to them, as it will color them, and injure their flavor and quality very much.

"I expect that many of our farmers will object to the mode of manuring hops which I have recommended, their common practice being to put the manure in the hills when they plant the hops, and afterwards to apply the manure on the hills at the first and second hoeings. I find the hop-roots are very liable to be injured by the worms, and to decay. My opinion is, that the manure in the hill has a tendency to produce the worms, and its fermentation at their roots to cause their decay; and that the crop is not more, if as abundant, as when manured in the manner I have recommended; and, farther, that a hop-yard manured in this manner will continue in a healthy state for many years.

"I also expect the quantity of manure I have recommended will be objected to by many, it being the commonly received opinion, that hops should have little or no manure. I find it a general complaint amongst the farmers where hops have been cultivated many years, that the quantity raised per acre does not exceed the one half raised by their ancestors on the same land; inferring that the 'hops are running out,' as it is termed, and cannot now be cultivated to advantage. Hops, in common with all sorts of grain and vegetables, flourish best and produce the finest crops when cultivated on new lands, which require little or no manure; and such were the lands which their ancestors cultivated. The same complaint, I presume, would be made against all sorts of grain and vegetables, if raised with little or no manure, on lands that have long been cultivated."

PEA. (*Pisum Sativum.*) The pea is a nardy annual, a native of the south of Europe, cultivated in Great Britain from time immemorial, and in this country from its first settlement.

Times of Sowing. "The dwarfs are generally employed in hotbed culture, which, however, succeeds badly, and is neither worth preserving nor describing, and the less so, as early crops may be more certainly had by sowing in the fall, in sheltered situations, and covering during the winter with a layer of leaves, and another of long stable-litter, loosely applied, to keep the leaves in their places. After the earth takes a temperature favorable to vegetation, your pea sowings should be made once a fortnight, to keep up a regular and successive supply." — *Armstrong*.

Quantity of Seed. "Of the small, early kinds, one pint will sow a row of twenty yards; for the larger sorts, for main crops, the same measure will sow a row of thirty-three yards."

Process in Sowing. "For early sorts, make the drills one inch and a half deep; and let parallel drills be two feet and a half, three, or four feet asunder. Peas that are to grow without sticks require the least room. For summer crops and large sorts, make the drills two inches deep, and four, five, or six feet asunder. As to the distances along the drill, distribute the peas according to their size and the season; the frame, three in the space of an inch; the Charltons, Hotspur, and dwarf marrowfat, two in an inch; the Prussian blue and middle-sized sorts, three in two inches; the large marrowfat and Knight's, a full inch apart; the moratto, rouncivals, and most larger sorts, an inch and a half apart; and the Patagonian, two inches."

Soil and Situation. "The soil should be moderately rich, and the deeper and stronger for the lofty growers. Peas are not assisted, but hurt, by unreduced dung recently turned in. A fresh, sandy loam, or road-stuff, and a little decomposed vegetable matter, is the best manure. The soil for the early crops should be very dry, and rendered so, where the ground is moist, by mixing sand with the earth of the drills." — *Loudon*.

Armstrong says, "A loose and warm soil is most favorable to this vegetable, which, by the way, is neither improved in quality nor quantity by stable manure. The soil of Clichy, and of Point de Jour des Colombe, &c., in the neighbourhood of Paris, is a pure sand, principally devoted to pea crops, and yielding these most abundantly without the application of dung, new or old."

Subsequent Culture. "As the plants rise from half an inch high to two or three inches, begin to draw earth to the stems, doing this when the ground is in a dry state, and earthing gradually higher as the stems ascend. At the same time, with the hoe, loosen the ground between the young plants, and cut down rising weeds. Early crops should be protected during hard frosts by dry straw or other light litter, laid upon sticks or brushwood; but remove the cover ing as soon as the weather turns mild. If, in April, May, and the course of the summer, dry weather occurs, watering will be necessary, especially to plants in blossom and swelling the fruit; and this trouble will be repaid in the produce. Rows partly cut off may be made up by transplanting. In dry weather, water, and in hot weather, shade, until the plants strike. All peas fruit better for sticking, and continue longer productive, especially the larger sorts. Stick the plants when from six to twelve inches high, as soon as they begin to vine. Provide branchy sticks of such a height as the sort will require; for the frame and Leadman's dwarf, three feet high; for the Charlton and middle-sized, four or five feet; for the marrowfat and larger kinds, six or eight feet; for the rouncival, and for Knight's marrow-pea, nine or ten feet. Place a row of sticks to each line of peas, on the most sunny side, east or south, that the attraction of the sun may incline the plants towards the sticks. Place about half the number on the opposite side, and let both rows stand rather wider at top than at the ground. Some gardeners stop the leading shoot of the most early crop when in blossom; a device which accelerates the setting and maturity of the fruit.

To forward an early Crop. "Sow or plant in lines from east to west, and stick a row of spruce-fir [or other evergreen] branches along the north side of every row, and sloping so as to bend over the plants, at one foot or eighteen inches from the ground. As the plants advance in height, vary the position of the branches, so as they may always protect them from perpendicular cold or rain, and yet leave them open to the full influence of the spring sun. Some cover, during nights and in severe weather, with two boards, nailed together lengthwise, at right angles, which forms a very secure and easily-managed covering, but excludes light. A better plan would be to glaze one of the sides, to be kept to the south, and to manage such row-glasses, as they might be called, when over peas, beans, spinage, &c., as hand-glasses are managed when over cauliflower; that is, to take them off in fine weather, or raise them constantly or occasionally by brickbats, or other props, as the weather and the state of the crop might require." — *Loudon.*

Management of a late Crop. The best variety for this purpose is Knight's marrow-pea, which may be sown at intervals of ten days from the beginning to the end of June. "The ground is dug over in the usual way, and the spaces to be occupied by the future rows of peas are well soaked with water. The mould upon each side is then collected, so as to form ridges seven or eight inches above the previous level of the ground, and these ridges are well watered. The seeds are now sown in single rows, along the tops of the ridges. The plants grow vigorously, owing to the depth of soil and abundant moisture. If dry weather at any time set in, water is applied profusely once a week. In this way, the plants continue green and vigorous, resisting mildew, and yielding fruit till subdued by frost." — *Hort. Trans.* Vol. II.

To save Seed. "Like other vegetables, the pea is susceptible of considerable improvement, and by the simple means of marking the finest plants of each variety, and keeping them for seed. Wilson's frame and the Knight pea have been formed in this way, and afford sufficient proof of the wonders produced by a very small degree of observation and care." — *Armstrong.*

Field-culture of the Pea. The most common mode of sowing peas is broad-cast; but the advantages of the row culture, in a crop so early committed to the ground, must be obvious. Loudon says, "In Kent, where immense quantities of peas are raised, both for gathering green and for selling ripe to the seedsmen, they are generally sown in rows from eighteen inches to three feet asunder, according to the kind, and well cultivated between. Peas laid a foot below the surface will vegetate; but the most approved depth is six inches in light soil, and four inches in clay soil; for which reason they ought to be sown under furrow when the ploughing is delayed till spring. Of all grain, beans excepted, they are in the least danger of being buried too deep." — *Loudon.*

Deane observed, that "for field peas, land that is newly ploughed out of sward is generally accounted best; and land which is high and dry, and has not been much dunged. A light, loamy soil, is most suitable for them; and if it abound with slaty stones, it is the better. But they will do in any dry soil. The manures that suit peas best are marl and lime. Our farmers do not commonly allow a sufficient quantity of seed for peas, in broad-cast sowing. When peas are sowed thin, the plants will lie on the ground, and perhaps rot; when they are thick, the plants will hold each other up with their tendrils, forming a continued web, and will have more benefit of the air."

Insects and Diseases. "The Massachusetts Agricultural Repository," for June, 1822, contains some remarks of the Hon. T. Pickering, relative to a bug or fly, (*bruchus pisi,*) which preys on the pea, in which he observes, that an effectual remedy for this evil is *late sowing;* but the hot sun of June will so pinch the vines of the late sown peas, that the crop will be small, unless the land be moist as well as rich. He then details some experiments, by which he concludes, that this insect is limited to a certain period for depositing its eggs; and if the tender pods are not found till that period has passed, the peas will be free from bugs Colonel Worthington, of Rensellaer county, New York, "sowed his peas on the 10th of June, six years in succession, and a bug has never been seen in his peas; whereas his neighbours, who have not adopted this practice, have scarcely a pea without a bug in it. He supposes the season for depositing the egg of the pea-bug is passed before the peas are in flower."— *Memoirs of New York Board of Agriculture*, Vol. II. p. 23. "The only insect that commonly injures our peas, is a small brown bug or fly, the egg [or larva] of which is deposited in them when they are young, and the pods easily perforated. The insect does not come out of its nest till he is furnished with short wings. They diminish the peas in which they lodge nearly one half, and their leavings are fit only for the food of swine. The bugs, however, will be all gone out if you keep them to the following autumn. But they who eat buggy peas the winter after they are raised, must run the venture of eating the insects."— *Deane's New England Farmer.*

The same writer recommends, when seed peas are known or suspected to contain insects, to scald them a quarter of a minute in boiling water, spread them about, and sow them without delay. If any of the bugs should be in the peas, this scalding will destroy them; and the peas, instead of being hurt, will come up the sooner, and grow the faster.

Mildew is another evil attending peas, especially such as are sown late in the season. This disorder is supposed by Knight, to be caused by "a want of a sufficient supply of moisture from the soil, with *excess* of humidity in the air, particularly if the plants be exposed to a temperature below that to which they have been accustomed." The remedy which he recommends is, to "give water rather profusely once a week, or nine days, even if the weather proves showery."— See *New England Farmer*, Vol. I. p. 414.

Use. The use of peas for soups and other culinary purposes is well known. They are likewise very serviceable in fattening hogs, for which purpose they should be harvested dry, and ground into meal. If the straw be forward in autumn, and has been harvested without injury, it will be little inferior to ordinary hay for feeding cattle.

"In boiling split peas, some samples, without reference to variety, fall or moulder down freely into pulp, while others continue to maintain their form. The former are called *boilers*. This property of boiling, depends on the soil; stiff land, or sandy land that has been limed or marled, uniformly produces peas that will not melt in boiling, no matter what the variety may be." — *Loudon*.

"When peas are sown before winter, or early in spring, they are very apt to be eaten by mice. To prevent this, soak the peas for a day or two in train oil before you sow them, which will encourage their vegetation, and render them so obnoxious to the mice that they will not eat them." — *Domestic Encyclopedia*.

BEANS. Loudon gives the following directions for the culture of *runners*, or *pole-beans*, as they are commonly called in this country: — The runner kidney beans may be sown in a small portion towards the end of April, [about the middle of May in New England,] if tolerably warm, dry weather; but as these beans are rather more tender than the dwarf sorts, more liable to rot in the ground by wet and cold, especially the scarlets, the beginning or middle of May [first of June in New England] will be time enough to sow a considerable crop; and you may sow a full crop about the beginning of June. Allot principally the scarlet and large white runners. Some Dutch runners are very eligible as a secondary crop. The first crops should have the assistance of a south wall. Intermediate crops may be sown in any open compartment, or against any fence not looking north. The latest sown will continue bearing longer under a good aspect and shelter. In sowing, draw drills about an inch and a half, or not more than two inches deep. Let parallel rows be at least four feet asunder, to admit in the intervals tall sticks or poles for the plants to climb on. Place the beans in the drills four inches apart, and earth them in evenly the depth of the drills. A row contiguous to a fence or building may ascend upon lines. Some may be sown in a single row along a border, or on each side of a walk, and have the support of a slight trellis of laths and lines; or they might be arched over with similar materials, to form a shady walk or bower. In a cold, wet season, or when requisite to have a few plants more forward than the general crop, some scarlets may be sown in April, either in a slight hotbed, or in pots, under frames of hand-glasses, to raise and forward the plants, till two or three inches high; then, at the end of May, transplant them into the open garden As the plants come up, and advance from three to six inches in growth, hoe some earth to the stems, cutting down all weeds. When they begin to send forth runners, place suitable supports to each row; and conduct the tendrils to the sticks or lines, turning them in a contrary direction to the sun. The ascending plants will soon come into flower, podding at the joints, in long succession. They are so prolific, that the returns from three sowings, in May, June, and July, will last from July till October.

Taking the Crop. Gather the pods, both from dwarfs and runners, while they are young, fleshy, brittle, and tender, for then they are in the highest perfection for the table; and the plants will bear more fully, and last longer in fruit, under a course of clean gathering, not leaving any superabundant pods to grow old.

To save Seed. Either sow a portion for that object, or leave rows wholly ungathered of the main crop, or preserve a sufficiency of good pods promiscuously. The beans saved should be the first fruits of a crop sown at a period which throws the entire course of growth into the finest part of summer. Let them hang on the stalks till they ripen fully, in August and September; then let the haulm be pulled up and placed in the sun, to dry and harden the seed, which should be afterwards cleared out of the husks, bagged up, and housed.

The pea, English bean, and kidney bean, are liable to the attacks of various insects, especially the *aphides*, [plant lice,] in dry seasons. When early crops are newly sown or planted, mice will burrow for and eat the seed, and when it begins to penetrate the soil, it is attacked by snails, slugs, the cut-worm, &c. The usual means of guarding against the ravages of insects must, therefore, be resorted to by the gardener.

As regards the field-culture of the bean, we would observe, that the white kind, which is most generally approved of in New England, will produce pretty good crops on poor, sandy, or gravelly soils ; but, when planted on such ground, it is good husbandry to wet and roll them in plaster before planting. They may be planted in hills or drills, the rows two and a half or three feet apart, according to the strength of the soil, and cultivated like other hoed crops. They may be planted the latter end of May, or beginning of June, or about the time of planting Indian corn. If planted in hills, they may be placed from fourteen to twenty-four inches apart in the rows, and the rows the distance before mentioned. Five beans are quite enough to remain in a hill. Hogs' dung, mixed with ashes, is said to be the best manure for them ; and it is said to be very injurious to beans to hoe them while the dew is on, or in wet weather.

Judge Buel, of Albany, has given the following notices of some experiments in the field-culture of this vegetable : "Beans may be cultivated in drills or in hills. They are a valuable crop ; and, with good care, are as profitable as a wheat crop. They leave the soil in good tilth. The China bean, with a red eye is to be preferred. They ripen early, and are very productive. I cultivated beans the last year in three different ways, viz. in hills, in drills, and sowed broad-cast. I need not describe the first, which is a well-known process. I had an acre in drills, which was the best crop I ever saw. My management was this ; on an acre of light ground, where the clover had been frozen out the preceding winter, I spread eight loads of long manure, and immediately ploughed and harrowed the ground. Drills or furrows were then made with a light plough, at the distance of two and a half feet, and the beans thrown along the furrows, about the 25th of May, by the hand, at the rate of at least a bushel on the acre. I then gauged a double mould-board plough, which was passed once between the rows, and was followed by a light one-horse roller, which flattened the ridges. The crop was twice cleaned of weeds, by the hoe, but not earthed. The product was more than forty-eight bushels, by actual measurement. The beans brought me one dollar the bushel last fall. The third experiment was likewise upon a piece of ground where the clover had been killed. It was ploughed about the 1st of June, the seed sown like peas, upon the first furrow, and harrowed in. The drought kept them back; but about sixty-five rods of ground, on which the experiment was made, gave a product of twelve and a half bushels. The crop was too ripe when it was harvested, and as it was cut with a scythe, I estimated that about two and a half bushels were left upon the ground. No labor was bestowed upon them from the time they were sown till they were harvested.

SWINE. Notwithstanding their evil propensities, filthy and mischievous habits, and insatiable voracity, swine are very profitable animals to a farmer. Indeed, every family in which there is any cooking done should keep at least one hog, always confined in a proper pen, in order to consume the washing of pots, dishes, refuse food, &c.

As much depends on the breed of swine as of any domestic animal, as relates to the profit of keeping. The old-fashioned, thin, long-legged, long-nosed, gaunt-bodied hogs are now, we believe, hardly tolerated in New England, and are becoming as scarce as they are ugly and unprofitable. We are but little acquainted with the different breeds of their successors, and shall not therefore assume the responsibility of recommending any particular race. O. Fiske, Esq., of Worcester, an able, enlightened, and patriotic cultivator, says, "My hogs are of the Bedford breed, so called in England; and experience has proved to my satisfaction that this breed is far the best that has been introduced into our country. They are quiet in their nature, fat easy, and with little expense or trouble. I have had some weigh at twelve months old about three hundred and forty pounds, and a considerable number of eighteen months old four hundred pounds."

"The marks of a good hog are, a moderate length in proportion to the size of the body; the nose short; the cheek plump and full; neck thick and short; quarters full; carcass thick and full; hair fine and thin; with a symmetry adapted to the breed to which it belongs. Above all, it is essential that it be of a kindly disposition to fatten early."

The sow should be selected with great care, broad and straight-backed; wide hips; a great many teats; short legs, and fine bone. It is said that the sow will produce the stronger and better litter if not allowed to breed till a year old, and the boar should not be younger than that age when put to sows. Sows may be allowed to breed till they are six years old, and boars till five; and both be made good pork after this period, by methods which do not require description. One male, according to "The Complete Grazier," should not be permitted to have access to more than ten females in a year. Sows will usually have pigs twice a year, and should be put to the males at such times as will bring one litter in April and another early in September.

"Those sows are accounted the best breeders," says "The Farmer's Assistant," "which have about ten or twelve paps. They should be kept clean and well littered; but should not have too much litter at the time of pigging, lest they overlay their pigs in it. At the end of a week or ten days, they should be let out of their sties into the yard for three or four hours each day. Where several sows are farrowing about the same time, they must be kept in separate apartments in the sty, lest they devour the pigs of each other. Young sows will sometimes eat their own offspring, which may be prevented, by washing the backs of the pigs in an infusion of aloes; and, for this purpose, the sows must be watched. It is said that supplying them with plenty of water at this time will prevent any mischief taking place of this kind."

Mr. Featherstonhaugh says, "Farmers differ much in their plans of raising stock for pork; some permitting their shoats to run at large eighteen months, till they are penned up to fatten; this is the most troublesome and least profitable way; others give them a range in clover pastures, and begin to fatten them earlier. I apprehend there is a much more profitable way, and attended with less trouble for those who have the right breed. According to the quantity of pork wanted should be the number of breeding sows kept over, and there should be no other hogs on the farm [that is, kept over winter] but the breeding sows. These, when they pig the latter end of March, should be fed in the most attentive manner, with swill and shorts. The pigs from a full-grown sow will generally be twelve in number; these should be thinned down to eight, and as soon as they begin to feed freely out of the trough should be weaned, and afterwards fed regularly with green tares, clover, boiled potatoes, ground peas, unmerchantable corn, or any other nourishing food; turning them out every day into a small yard, where there is a shallow pond for them to lie in A remarkable breed of pigs, which had been treated pretty much in this manner, were exhibited at Duanesburgh fair; when eight months old, one of them was slaughtered, and weighed exactly three hundred and eleven pounds ; they all attracted universal attention, and I never saw such animals before. This method, as it is attended with little trouble, and leaves so small a quantity of stock on hand to winter over, appears to me to be more economical, in every point of view, than any other which is practised."* In the county of Rensellaer, New York, some farmers assert, that "March pigs, killed about Christmas, are the most profitable for pork." Others say, "pigs ought never to come until June; for the cost of earlier pigs exceeds the profit." And, farther, we learn that "the methods proposed for fattening hogs by the different farmers in that county are very various. General H. Moffit, H. Platt, Esq., Colonel Worthington, Messrs. J. Phillips, A Bush, and some others, recommend keeping hogs in pastures, with some slops from the dairy, &c., till near the last of August; some say a little later. All agree that near this time they manifest a disrelish for grass. Small patches of peas, or even of corn, will then be convenient to turn them into for a few weeks. About the first of September begin with boiled potatoes and pumpkins, mashed together, with a little Indian meal, ground oats and peas, or other grain, stirred into the mixture after it cools. From two to four weeks before killing time, the food should be dry Indian corn, and clean cold water. Mr. Yonghans fattens his hogs in a large yard or field, with a shelter in it to which they may retire to sleep. But elder Turner says, hogs should never know what liberty is, but should be kept close all their lives, and as inactive as possible ; that with this method double the quantity of pork can be produced with the same expense of feed."†

The practice in Scotland is, to rear swine chiefly on raw potatoes, and to fatten them on these roots, boiled or prepared by steam, with a mixture of oats, barley, or bean and pea-meal. Their troughs should be often replenished with a small quantity of food at a time, and kept always clean, and seasoned occasionally with salt. ‡ "The Farmer's Magazine" says, "The outside leaves of cabbages, salted and let stand a month, and then mixed with buttermilk, will fat a hog in three weeks." Mr. Marshall says, ("Midland Counties," Vol. V. p. 453,) "Young pigs require *warm* meat to make them *grow*. Corn and cold water will make them healthy; but warm beverage is considered as requisite to a quick growth." The same writer mentions another practice, which perhaps it may be thought proper to imitate in this country, because it saves labor and care. Some English farmers, he says, "keep two or three little store pigs in the fatting sty. While the fatting hogs are taking their repast, the little ones wait behind them, and as soon as their betters are served, lick out the troughs.

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* Memoirs of the New York Board of Agriculture, Vol. I. p. 332.

† Memoirs of the New York Board of Agriculture, Vol. II. pp. 39, 40

‡ Report of Agriculture in Scotland.

"Besides the advantage of having by this expedient no waste nor foul troughs, there is another. The large pigs rise alertly to their food, lest the small ones should forestall them; and fill themselves the fuller, knowing that they have it not again to go to.

"The disadvantage of this practice is, I understand, the large ones are apt to lord it too much over the little ones; especially in a confined sty. If, however, they had a separate apartment assigned them, with an entrance too small for the fatting swine to follow them, this disadvantage would be in a great measure remedied."

If one wishes to fatten hogs, and either from indolence or too much occupation does not expect to give them a constant and regular attention, perhaps he may adopt to advantage the following mode, pointed out by an English writer. "Mr. John Adams, of Cherrington, near Newport, Shropshire, has fattened eight pigs in the following cheap and easy manner: he places two troughs in the sty, one he fills with raw potatoes, the other with peas, and gives no water; when the pigs are dry they eat the potatoes. The eight pigs were fattened so as to weigh from sixteen to twenty score each, and ate no more than thirty bushels of peas, and about two hundred bushels of potatoes." No doubt dry Indian corn and potatoes might be fed out in this way with as good an effect as peas and potatoes.

Rubbing and currying the hides of fattening hogs is of great advantage to them. It is not only very grateful to them, but conducive to their health. It will be well, likewise, in every sty to place a strong post for the animals to rub against. During the time of their fattening they should have plenty of litter, which will be a double advantage, providing for the comfort of the animal and increasing the quantity of manure.

Boiled or steamed clover hay will, it is said, keep store hogs in the winter, but the addition of boiled or steamed potatoes or carrots will much increase the value of the wash. Mr. Young directs to soil or feed swine in a yard on clover, cut up with a scythe, in preference to pasturing them in the field. But Judge Peters, of Pennsylvania, says, "In summer my hogs chiefly run on clover. Swine feeding on clover in the fields will thrive wonderfully; when those (confined or not) fed on cut clover will fall away." In Indian harvest, the unripe ears of corn should be picked out and given to the hogs as fast as they can eat them. Soft corn (as it is called) will do them much more good in a green than in a dried state, and it is very difficult to dry it without its turning mouldy.

There is a great advantage in boiling, steaming, or baking almost all sorts of food given to swine. The last American edition of "The Domestic Encyclopedia," informs, that "Mr. Timothy Kirk, of Yorktown, Pennsylvania, fed one pig with boiled potatoes and Indian corn, and another with the same articles unboiled. The two animals were weighed every week, and the difference between them was as six to nine. The experiment was continued several weeks, and the animals alternately fed upon boiled and unboiled food, with a uniformity of result, which sufficiently showed the very great profit arising from boiled food." Steaming will answer as good a purpose as boiling, and with a proper apparatus may be more easily and cheaply effected.* Potatoes, meal, and a little linseed boiled together, make a rich and excellent wash. Boiled linseed, it is said, has a tendency to make pork soft and oily, and should therefore be but little if at all used towards the close of the time in which hogs are fattening. Grains of distilleries and the refuse of starch factories are excellent for fattening swine. Sweet apples are very good food for them, and a change of diet pretty often promotes their health and quickens the process of fattening. Their meals should frequently be seasoned with a little salt. "The Complete Farmer," says, that "moist sedgy grounds are good for swine, the roots which grow in such soils they will eat; likewise brakes, ground-nuts, acorns, chestnuts," &c. Dr. Anderson said, that the hogs that are fed upon the acorns that they gather in the woods of Germany and Poland are reckoned to yield the finest bacon of any in Europe; and it is to this that most people ascribe the superior excellence of Westphalia hams. It might be well to try acorns, steamed or boiled, in order to correct their crudeness and bitterness; and it has been recommended to moisten them, and keep them on hand till they begin to sprout, when they will be more sweet and nutritious than in their original state. "The Complete Farmer" asserts, that "when hogs are fatted *entirely* on acorns, chestnuts, and other productions of the forest, the flesh will eat much better and sweeter than if fattened in a sty. Some indeed say their fat will not be so solid, nor so profitable, and therefore they commonly shut them up a week or ten days, and feed them with dry peas; but this is a mistake, *experience having shown that hogs fatted with acorns only have their fat as solid as those fatted with peas.*" If this be correct, the value of acorns as food for swine is not generally known in those parts of the United States with which we have been acquainted. We have seen places in the neighbourhood of farmers' dwellings where bushels might be had for stooping, but were as much neglected as if they had been pebble stones. The acorns recommended are, we believe, those of the white oak; and whether the acorns of the numerous other kinds of oak are of any value as food for swine we cannot say. It might be well to try them, not only raw, but boiled or steamed, and likewise ground into meal, and given with, as well as without other mixtures. We suspect that acorns alone would prove astringent, and if so, they might be qualified with a trough full of raw potatoes.

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* See New England Farmer, Vol. I. p 23.

Carrots, according to Mr. Young, are better than potatoes, and some other writers assure us, that parsnips are better than either for feeding hogs. An English writer says, "They fatten all their pork in the island of Jersey with parsnips. They are much more saccharine than carrots, and it is well known that nothing fattens a hog faster or makes finer pork than the sugar-cane:" and we are told, that parsnips, suffered to remain in the ground where they grew through the winter, and drawn in the spring, and boiled, tops and bottoms, made most excellent food for swine when other food was scarce.

Acid or fermented food for swine has been highly recommended. Mr. Arthur Young, whose authority amongst husbandmen is almost equal to that of the pope with Roman Catholics, says, "that the most profitable method of converting corn of any kind into food for hogs is, to grind it into meal, and mix this with water in cisterns, in the proportion of five bushels of meal to one hundred gallons water; stirring it well several times a day for three weeks in cold weather, or a fortnight in a warmer season, by which it will have fermented well and become acid, till which it is not ready to give. The mixture should always be stirred immediately before feeding, and two or three cisterns should be kept fermenting in succession, that no necessity may occur of giving it not duly prepared." Judge Peters, of Pennsylvania, whose authority is, in our opinion, not inferior to that of any man who ever wrote on agricultural topics, says, in substance, that "sour food is most grateful and alimentary to swine. One gallon of sour wash goes farther than two of sweet." But

An English work, entitled "Farmer's Calender," (author's name not given,) declares, that "much has been said, and little understood, about *purposely* souring food for hogs. It is not that acidity can possibly tend to pinguefaction, [making fat,] but it is found the pigs will readily fatten upon acid, or rather acescent food, a sweetish taste and glutinous quality succeeding fermentation; *and that they will do so still more readily upon such as has never reached the acid state, I know and have seen in hundreds of instances.* Is a proof wanted? How much more readily do the country hogs feed upon sweet and unfermented food, than those of the starch-house upon the fermented and subacid wash, however rich. I say subacid, for did not starch-makers run off a great part of that which is really *sour*, they would kill instead of fatten their hogs."

In order to reconcile these writers, it will only be necessary to advert to the different stages of ordinary fermentation, and the products of each stage. The first stage of fermentation produces sugar, and is called the saccharine fermentation. The second stage developes alcohol, or spirit of wine, and is called the vinous fermentation. The third stage produces vinegar, and is called the acid fermentation; and the fourth and last stage converts the matter fermenting into a substance which is not only offensive, but poisonous, and is called the putrid fermentation. Thus if you soak wheat or other farinaceous substance in water of a proper temperature, it will first become sweet, and begin to sprout or vegetate; it will next afford spirit or alcohol; continue the process, the wash turns sour, at first slightly, and then more strongly acid; and at last the whole becomes putrid. It probably contains most nourishment when it is sweetest, but it is valuable till very sour, when it is worth little or nothing; and when the putrid fermentation has commenced it is worse than nothing, as food for any animal. The farmer then should give his wash to his pigs while it is yet sweet, or but beginning to turn sour.

Fattening Pigs on Coal. Cunningham, in his "Two Years in New South Wales," relates, "I had often heard it said among sailors that pigs would fatten on coals, and although I had observed them very fond of munching up the coals and cinders that came in their way, still I conceived they might relish them more as a condiment or medicine than as food, till I was assured by a worthy friend of mine, long in command of a ship, that he once knew of a pig being lost for several weeks in a vessel he commanded, and it was at last found to have tumbled into the coal-hole, and there lived all that period without a single morsel of any thing to feed upon but coals: on being dragged out, it was found as plump and fat as if it had been feasting on the most nutritious food. Another friend told me of a similar case, which came under his observation; and although these may be solitary instances, yet they serve at least to show the wonderful facility which the stomachs of certain animals possess of adapting their digestive powers to such an extraordinary species of food, and extracting wholesome nourishment therefrom When we consider coal, however, to be a vegetable production, containing the constituent principles of fat, carbon, hydrogen, and oxygen, our surprise will decrease."

An Ohio farmer also, in a southern paper, recommends coals as useful in fattening hogs. After giving his hogs a small quantity daily, say two pieces to each, about the size of a hen's egg, they discontinued rooting, were more quiet, and appeared to fatten faster. He omitted the coal a few days, and they commenced rooting; he gave it again, and they ceased to root. He supposed that the coal corrects the morbid fluid in the stomach, which incites them to root deep in search of fresh earth.

The following mixture for fattening swine has been recommended:

Wash potatoes clean, boil and mash while hot, mix in at the same time oats and pea meal. Put the mixture into a large tub, which must stand till it becomes sour, but not putrid. Keep a quantity of this on hand, always fermenting and give it to your hogs as often as they will eat.

Apples have been much recommended as food for swine. They are good raw, but better if boiled and mixed with meal. A writer in a Brattleborough paper observes, ' I have tested by ten years' experience the value of apples as food for animals. I keep five or six hogs in my orchard, upon nothing but apples and a little swill; and have uniformly found them to grow and gain flesh faster than hogs fed upon any thing else but grain. On the 1st of November, they are very decent pork; after which I feed them about six weeks on grain before I kill them; and I believe I have as fat hogs and as good pork as my neighbours, who give to their hogs double the quantity of grain that I do to mine"

Sows devouring their Offspring. It is not unfrequently the case that sows destroy their offspring. In "The New England Farmer," (Vol. V. p. 214,) is a communication from the Hon. O. Fiske, in which he observes, "In most cases where I have inquired into the fact, whether in old or young breeders, I have ascertained that they have been disturbed in some of their essential habits, either having been removed from their companions, their range restricted, or from being removed from one pen to another. All these changes, however, may be effected with safety, by allowing them sufficient time to become accustomed to them, four or five weeks at least. I have known sows do well with a second litter after having destroyed a first under one of the above excitements. Hence, it would be unwise to condemn to death one which bid fair otherwise to be a valuable breeder, even for this most unnatural crime."

Another writer directs to "separate the sow from the rest of the swine six or eight weeks before her bringing forth, so that she may become accustomed to her pen. Care should be taken, however, to have her pen kept dry and well littered; always give them litter enough so as not to be obliged to give any for six days before the time, for nothing disturbs a sow more than an abundance of litter, and which in my opinion has a great tendency to induce her to destroy her young. If the sow is with the other swine till within a few days of her bringing forth, and then separated, she will not get accustomed to her pen, and being disturbed, she will be pretty sure to destroy her pigs.

"Raw salt pork, cut in small pieces, and given, will prevent them from eating their pigs. I have seen it given after they had ate two or three of their litter, with good success. But to prevent any mischief it should be kept by them at this time."* A writer for the same paper, (Vol. XI. p. 298,) observes, 'I have been careful for about a week before my sows were about to farrow, to give them some butcher's refuse meat, which does not cost much; if easy to be procured give them a plenty, and I will venture to say that they will not eat their pigs."

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* New England Farmer, Vol. XI. p. 297.

Another, in the same volume, p. 305, observes, "When the period of yeaning is near, I take the sow apart and give her free access to a *warm bedroom* of ample dimensions in my barn, with *a dry plank floor*, where the shingled walls prevent the entrance of cold, rain, or wind, with just enough straw to amuse her 'moments of anxiety,' but not enough to allow a single pig to cover his head and lose his road to the fountain of comfort." A writer with the signature "Berkshire," in the same volume, p. 321, states as his opinion, that the evil is caused by confining the sow in a light pen from the ground, and the want of a suitable supply of potatoes, turnips, ruta baga, &c., in addition to their other food. "*Whaler*," in the same paper, p. 338, who has raised fine pigs on board of a whale ship, at sea, without grass or roots, believed animal food the specific remedy for the unnatural inclination of sows to devour their offspring. And "A Subscriber" "is sanguine in the opinion, that if sows are so placed as to be able to come to the ground a few days before pigging, no disappointment would ever happen in the loss of pigs. It is not convenient to let them ramble at large; a temporary pen upon ground is equally good."

Swine should not be kept in close and filthy pens. Though they wallow in mire, their object is coolness, not nastiness, and they thrive faster and enjoy better health when allowed clean and dry lodgings than when they are not thus accommodated. The late judge Peters, of Pennsylvania, in an article entitled "Notices for a Young Farmer," &c., observed, that "there is no greater mistake than that of *gorging* swine, when first penned for fattening. They should, on the contrary, be moderately and frequently fed, so that they be kept full, but do not loathe or reject their food, and in the end contract fevers and dangerous maladies, originating in a hot and corrupted mass of blood. In airy and roomy, yet moderately warm pens, paved and boarded, and often cleaned, they are healthy and thriving. They show a disposition to be cleanly, however otherwise it is supposed, and always leave their excrementitious matter in a part of the pen distinct from that in which they lie down No animal will thrive unless it be kept clean"

The same writer asserted in substance, that fatting hogs should always be supplied with dry, rotten wood, which should be kept in their pens, for the animals to eat as their appetites or instincts may direct. It has been supposed, likewise, that swine thrive the better when they can obtain fresh earth, which they are often observed to swallow with greediness.

It is an object of much consequence to obtain the best breed of swine, not only as regards the saving of food, but producing the best qualities of flesh. The Hon. Oliver Fiske, of Worcester, as before observed, has rendered great service to the community, by introducing to the notice of farmers in this country a variety of this animal called the **Bedford Breed.** This breed has been highly recommended by many who have ascertained their merits by trial. His excellency **Levi Lincoln**, late governor of Massachusetts, and president of the Worcester Agricultural Society, has given his opinion of this variety, in a letter, from which the following are extracts:

"I have great pleasure in voluntarily offering myself as your compurgator in the representations with which you have recently favored the public, of the Bedford breed of swine. The care and perseverance which have marked your attention to the prospects and value of these animals, and the success which has followed your exertions to introduce them to the favor of *practical* farmers, require, at least, an acknowledgment of obligation from all those who have been particularly benefited by your liberality, and from no one more than from myself. This breed of swine has taken the place of a long-legged, long-nosed, flat-sided, thriftless race, called by some the *Irish* breed, by others the Russian, which would barely pay by their weight for ordinary keeping, and never for one half the expense of fattening, if, indeed grain would make them fat.

"I had three pigs butchered from the same litter, precisely seven and a half months old. Their weights, when dressed, were two hundred and thirty, two hundred and thirty-five, and two hundred and thirty-eight and a half pounds. One sold in Boston for six and one-fourth cents per pound; the others were put up here for family use. The expense of keeping and fattening these pigs, I am satisfied, was less than with any other breed I ever raised, and the proportion of bone and offal to the valuable parts was surprisingly small. I have fifteen more on my farm, part designed for the market in the spring, and part to be kept over as store swine, and their appearance will furnish ocular satisfaction of the propriety of all which has been said in favor of the breed."

This breed of swine was brought to this country as a present to General Washington, from the Duke of Bedford, who committed them to the care of an English farmer by the name of Parkinson. This man took a farm in the neighbourhood of Baltimore ; but instead of sending the swine to General Washington, Parkinson sold them.

Captain John Mackay, of Boston, has exhibited at Brighton a peculiar and excellent breed of swine, which have repeatedly received premiums from the Massachusetts Agricultural Society.

MANURES. No soil will always prove productive without manure. Though naturally fertile, if some equivalent for its produce is not returned to it ; if it is always yielding and never receiving, it must, at length, become barren.

Particular spots, like Egypt, and other alluvial or interval lands, which are annually overflowed, derive manure from the bountiful hand of nature, and cannot be rendered barren by bad husbandry or continual cropping. Some soils, likewise, are not easily exhausted, and are easily recruited, in consequence of being composed of materials which attract and retain the food of plants from air and water, as well as afford a proper medium to prepare and communicate the principle of fertility.

Every species of matter capable of promoting the growth of vegetables may be considered as manure. Vegetables are composed of certain substances, called by chemists oxygen [formerly called vital air], hydrogen [inflammable air], carbon [coaly matter], and nitrogen, or azote, one of the constituent parts of the atmosphere. The substances employed as manure should be composed of all or some of these elements.

Vegetable and animal substances, deposited in the soil, are consumed during the process of vegetation ; being mostly absorbed by the roots of plants, combined with water. These substances compose what is called the food of plants. This food is mostly taken in by the roots, which are analogous to the mouths of animals, but some portion of the nourishment of vegetables is also derived from the atmosphere, imbibed by the leaves and bark. Thus the carcasses of lambs and other small animals are sometimes hung on the limbs of fruit-trees to promote their growth, and cause them to bear abundantly, and thus produce some effect; but the practice is slovenly and wasteful, as the air is contaminated, and the carcass buried near the roots would be much more efficient as manure.

A controversy has existed relative to the degree of fermentation which manure should undergo before it is applied to the soil. Some agriculturists contend that long, fresh, or unfermented manure is to be preferred. Others assert, that stable and barn-yard manure never should be spread in the field till the fibrous texture of the vegetable matter is entirely broken down, and it becomes perfectly cold, and so soft as to be easily cut with a spade.

Sir Humphrey Davy observes, "If the pure dung of cattle is to be used as manure, there seems no reason why it should be made to ferment, except in the soil; or if suffered to ferment it should be only in a very slight degree. The grass in the neighbourhood of recently voided dung is always coarse and dark green; some persons have attributed this to a noxious quality in unfermented dung; but it seems to be rather the result of an excess of food furnished to the plants.

"During the violent fermentation which is necessary for reducing farm-yard manure to the state of what is called *short muck*, not only a large quantity of fluid, but likewise of gaseous matter, is lost; so much so that the dung is reduced one-half or two-thirds in weight; and the principal elastic matter disengaged, in carbonic acid, and some ammonia; and both of these, if retained by the moisture of the soil, are capable of becoming useful nourishment of plants.

"It is usual to carry straw that can be employed for no other purpose to the dunghill, to ferment and decompose; but it is worth an experiment, whether it may not be more economically applied when chopped small by a proper machine, and kept dry till it is ploughed in for the use of the crop. In this case, though it would decompose much more slowly and produce less effect at first, yet its influence would be more lasting."

Robert Smith, Esq., president of the Maryland Agricultural Society, in an address to that society observed, "With respect to stable-dung, I shall for the present content myself by barely suggesting, that my experience strongly inclines me to the opinion that, however long, it ought to be ploughed into the ground without any previous stirring, and as soon as practicable after it has been taken from the farm-yard."

We believe that the question relative to long and to short manure must depend on circumstances. In certain soils, and for certain crops, long manure which has undergone but a slight fermentation is to be preferred. But if used for wheat, and other kinds of grain, and in all crops which cannot conveniently be hoed or weeded, or, probably, when applied to soils containing acids or some substances which may prevent fermentation and retard the progress of putrescence and dissolution, it must be well rotted.

Rotting manure, however, in a barn-yard, or in any situation in which its volatile and liquid products escape into the atmosphere, or soak into soil not designed to support vegetation, is very slovenly and wasteful, and always to be avoided if possible. The effluvia or gas which is suffered to escape from fermenting manure is not only almost altogether lost to useful vegetation, but, what is still worse, fills the atmosphere with particles injurious to health, and often destructive to life. The evaporations from a manure yard rob the farmer of a part of his substance, starve his crops, and it is well if they do not, moreover, poison him and his family by their contaminating influence. Some farmers' barn-yards, hog-pens, and other receptacles of manure, are very offensive, and if they do not generate typhus fever, in ts worst form, which we fear is frequently the case, they at least cause a degree of languor and debility, which embitters existence, and in a great measure disqualifies for any useful purposes of life. It is a fact that those exhalations so injurious to animal life are the essence of vegetable life, and the volatile substances which offend our senses and injure our health, if arrested in their transit by the hand of skilful industry, may be so modified in the great laboratory of nature as to greet us in the fragrance of a flower, regale us in the plum or nectarine, or furnish the stamina of life in substantial viands from the field and the stall of the cultivator.

If we are correct in the foregoing, an important axiom may be adduced, viz.: *No putrefactive process ought to be suffered to proceed on a farmer's premises, without his adopting some mode to save, as far as possible, the gaseous products of such putrescence.* These gaseous products constitute important elements of vegetable food, and a farmer may as well suffer his cattle to stray from his stall, or his swine from his sty, without a possibility of reclaiming them, as permit the principles of fertility expelled by fermentation or putrefaction to escape into the atmosphere for the purpose of poisoning the air, instead of feeding the plants. It is very easy to arrest these particles. A quantity of earth thrown over the matter in which the fermentation is going on will check its violence and arrest its gaseous products, which will be imbibed by the soil, and afterwards yielded to plants in such proportion as the wants of vegetation may require.

"Fermentation, that destroyer of all organic conformation, is not to be feared by the farmer, if it be conducted and carried on in the presence of earth, which fixes and secures the gases as fast as they are liberated. Even the degree of the process is a matter of less consequence; because if the elementary principles are in keeping, and reserved for future usefulness, it is immaterial whether this has happened by a new absorption, or by still holding their original and unchanged form. In his composite hill [compost heap], the whole animal or vegetable structure may be dissolved, and leave behind no trace of existence, without the least waste of the principles of fertility; because the ingredients superadded to the dung have become surcharged with them, or, to speak philosophically, fully saturated. We may go farther, and state that complete decomposition is desirable in this case, which is so much to be avoided in the farm-yard; because putrescent matter can only become vegetable food by its resolution into primary parts, and if this be effected by any preparatory step, the young crop receives the full and instantaneous benefit. The compost manure is carried to the field ready to give out its richness on the very first call, and to supply the nascent radicle [young root] with a copious share of nourishment.

"The putrefactive process may be carried on in the presence of pure earth only, or of earth intermingled with fibrous roots, or lastly in the presence of peat, which is an assemblage of inert vegetable matter, and compost dunghills may be formed according to this threefold method.

"The simplest of all composts is a mixture of barn-yard dung and surface mould taken from a field under regular culture. The proportions between the ingredients are fixed by no determinate laws, and consequently great liberty is allowable to the operator. I have known some instances where two cart-loads of dung were used for one of earth; others, where they were blended in equal quantities; and it is not unfrequent to compound two of earth with one of dung. In fact, such is the uncertainty in the composition, that almost every farmer adopts one peculiar to himself, and with equal success. No man need therefore follow implicitly the rules which have been laid down in this department of rural economy, but may vary and multiply his experiments, according to the suggestions of fancy or the dictates of convenience. If we slightly glance at the principle, we shall see the cause of this seemingly endless variety in the combinations of the ingredients. The only use of intermixing the soil with the dung is to imbibe the gaseous elements of vegetable life, and hinder their dissipation. If there be much soil, these elements will be diffused through it with less density and compression; if little, it will be more abundantly saturated and enriched with the nutritive vapors. The only error into which the farmer can run is, to supply such an inconsiderable quantity of soil as will be incapable of imbibing the elastic and volatile particles, and thus by his own mismanagement occasion a waste of the vegetable aliment. One cart-load of soil to two of stable-dung is the least proportion which he should ever attempt to combine, and perhaps if the two were mixed equally, he would be compensated for the additional labor and expense.

"Simple earth, although excellent for bottoming and strewing over the pit dug near the barn, is of all materials the most unprofitable in compost dunghills. A matted sward, thickly entangled with roots, or mud dragged from the bottom of bogs or ditches, and replete with aquatic plants, are clearly preferable on this account, that, besides bringing earth to the composition, they supply a large proportion of vegetable matter. Whenever the soil must be carted to the heap, it is better to lay out the expense in transporting these enriching materials; because they will not only equally absorb and retain the evaporating gases, but greatly augment the quantity of manure."*

The path proper for a farmer to pursue in order to make the most of his manure, and preserve his own health and that of his family, is as plain as a turnpike. Whenever putrid fermentation is going on in any part of his premises, and consuming his substance by a slow but wasteful combustion, let him apply earth, peat, or some other earthy substance in quantities sufficient to attract, imbibe, and retain all the effluvia. Health, profit, and cleanliness, equally require such a proceeding. We shall say a word or two on the latter topic. If a man were to swallow daily a quantity of filthy matter, or to eat his food impregnated with vapors from a manure heap, or from some other putrefying and offensive substance, when he might by a little exertion avoid such nauseous viands, and substitute something nourishing, palatable, pure, and wholesome, we should esteem him no better than a Hottentot. But a man may almost as well take filth into his stomach as filthy effluvia into his lungs; he may about as well dine with a crow or a buzzard as sup with a toad "on the vapor of a dunghill."

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* Letters of Agricola, by John Young, Esq.

The farmer who arrests the rank vapors which emanate from decaying animal and vegetable matter, and instead of permitting them to pass into and contaminate the air he breathes, treasures up the invisible particles with which they are laden, and applies them to feed useful vegetables, causes the atmosphere to be healthy, and his plants to be thrifty by the same means.

The celebrated lord Erskine, in a speech delivered at one of the annual sheep-shearings at Holkham, in England, made the following remarks on this subject:

"If we consider the subject of manure, we shall perceive one of the most striking beauties and benefits of divine ordination, and of that wisdom with which we are blessed a thousand ways without knowing it. This very substance, had it been useless, must have accumulated in heaps, intolerably noisome and perpetually pestilential; but by the blessing of Providence, it is every man's interest to remove these otherwise increasing mountains of filth, and by decomposition, in various ways, in a great measure concealed from us, it gives increase to our fields, and adds to our means of industry, and the reward of the husbandman."

Those who cultivate the ground do not always act the provident part supposed by lord Erskine, in the sentence above quoted. On the contrary, farmers too often suffer manure to accumulate and waste in heaps, generating effluvia "intolerably noisome and perpetually pestilential," without fear of fever or famine, both of which are courted by such conduct. Not only dung is too often allowed to waste its richness on the tainted air, but straw and other litter is suffered to grow mouldy and consume by what is sometimes called the dry rot, both of which might be prevented, or their bad effects obviated, by covering or mixing them with a suitable quantity of earth. Besides, dead animals, contents of privies, the emptyings of sinks, spoiled provisions, the refuse of the dairy, the pantry, and the cellar, are allowed to mingle their odours in nauseating and deleterious profusion. Sometimes the highway is rendered almost impassable, in consequence of a dead horse, sheep, dog, or cat, undergoing the process of decomposition in a situation correctly calculated to annoy travellers. Some farmers hang dead lambs, cats, dogs, &c., in the forks of apple-trees, or throw them on hovels or stumps, at some elevation from the ground, to give the pestilential emanations a chance to diffuse themselves, without coming in contact with the earth, which might convert them from poison to men and animals into food for plants. If, however, such animal remains are deposited in a barn-yard or manure heap, they are too often suffered to lie and rot on the surface, offending the senses, and injuring the health of a whole village. Practices of this kind are well reproved by Sir Humphrey Davy, who says, "Horses, dogs, sheep, deer, and other quadrupeds that have died accidentally or of diseases, after their skins are separated, are often suffered to remain, exposed to the air, or immersed in water, till they are destroyed by birds or beasts of prey, or entirely decomposed; and in this case most of their organizable matter is lost from the land on which they lie, and a considerable portion of it employed in giving out noxious gases to the atmosphere.

"By covering dead animals with five or six times their bulk of soil, mixed with one part of lime, and suffering them to remain for a few months, their decomposition would impregnate the soil with soluble matters, so as to render it an excellent manure; and by mixing a little fresh quicklime with it, at the time of its removal, the disagreeable effluvia will be in a great measure destroyed, and it might be employed in the same way as any other manure to crops."*

If, however, quicklime cannot readily be obtained to accelerate the conversion of dead animals into manure, it is probable that covering the carcasses with a pretty thick coat of unleached ashes, and placing over all a quantity of earth, or earthy substance, would hasten decomposition, and secure the gases resulting from putrescence. Earth alone will answer a valuable purpose, and, *in time*, the largest animal will be decomposed in nothing but common soil.

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* Agricultural Chemistry.

Not only the carcasses of animals, but their excrements and urine are rendered of little value by long exposure to the air. Indeed, every moment of such exposure robs them of a part of their fertility, as well as contaminates the atmosphere. "He who is within the sphere of the scent of a dunghill, (says the celebrated Arthur Young,) smells that which his crop would have eaten, if he would have permitted it. Instead of manuring the land, he manures the atmosphere ; and before his dunghill is finished, he has manured another parish, perhaps another county." As few exhalations as possible ought to be suffered to rise from the excrements of animals. Fresh manure ought to be kept as carefully from the sun and rain as grass which has been cut for hay. When cattle have been yarded over night, it would be well to throw their droppings into small heaps or beds, and cover them at least with a sufficient quantity of earth to prevent fermentation, or absorb its products. This would cost but little labor, and would much enhance the value of the manure.

It has been, and we believe in some instances still is, in vogue among farmers, to turn over and mix barn-yard manure several times before it is carried to the field. This practice, however, is exploded among the best informed cultivators. Mr. A. Young says "no turning, but if circumstances of the richness, quantity, or weather have occasioned too much fermentation, or this is suspected, scatter every now and then a quantity of the same earth over the surface, with which the yard was bedded. This may be so proportioned as to keep the mass from too much fermentation."

It is remarked by the author of "Letters of Agricola," that "Earth is a powerful absorber of all the gases which arise from putrefaction. The earth possesses not only the property of retaining the putrid steams which are formed from the dung of decomposing bodies within itself, but also of attracting the effluvia when floating in the air. The salubrity of a country depends on this latter quality ; as the practice of burying the dung in the earth is founded on the former. The stench proceeding from the dissolution of organized matter never rises through the ground to assail the nostrils, although it is sufficiently offensive from bodies corrupting in air or water. A strongly dunged field, after being ploughed, sown, and harrowed, sends forth a healthful and refreshing smell; a proof that all the putrid vapors, which otherwise would annoy us, are absorbed and retained for the nutrition of the crop. It is on this account that the poorest earth can be enriched in a very high degree by mere exposure to the gases of putrefaction. Put a layer of common soil along the top of a fermenting dunghill, from twelve to eighteen inches thick, and allow it to remain there while the process is carrying on with activity, and afterwards separate it carefully from the heap, and it will have been impregnated with the most fertilizing virtues. The composts, which of late have attracted such universal attention, and occupied so large a place in all agricultural publications, originated in the discovery of this absorbing power of the earth, and in the application of it to the most beneficial of purposes. A skilful agriculturist would no more think of allowing a violent fermentation to be going on in his dunghill, unmixed with earth or other matter to fix and secure the gaseous elements, than the distiller would suffer his apparatus to be set at work without surmounting his still with the worm to cool and condense the rarefied spirit which ascends to evaporation. In both the most precious matter is that which assumes the æriform state; and to behold it escaping, with unconcerned indifference, is a demonstration of the most profound ignorance."

Liquid Manure. Water in its purest state, when it has been distilled or filtered through sand, still retains somewhat of the food of plants. Its component parts, oxygen and hydrogen, under certain circumstances, are seized by vegetables while in their growing state, and converted into the products which form the constituents of all vegetables. But pure water forms a meagre diet for plants. It may support life in vegetables, and some plants will maintain a feeble growth with very little nourishment except what is afforded them by pure water and air. But when water is impregnated with certain salts and gases, particularly such as are evolved during the fermentation and decomposition of vegetable and animal substances, it becomes what is called *liquid manure*. Urine, or the stale of all animals, is water holding in solution certain salts and other substances, which are the *essence of manure*, or the food of plants in a concentrated state.

Fresh urine is a very powerful and efficacious manure, when properly applied, but if not mixed with solid matter it should be diluted with water, as when pure it contains too large a quantity of animal matter to form a proper fluid nourishment for absorption by the roots of plants. Urine is lessened in value, but its useful qualities are not entirely lost, by putrescence. During putrefaction the greatest part of the soluble animal matter that urine contains is destroyed, it should therefore be used as fresh as possible, with the precaution of diluting it with water, or mixing it with earth. Putrid urine, however, is a valuable manure. It abounds in ammoniacal salts; and though less active than fresh urine, is very efficacious.*

According to some writers and practical farmers, the value of the urine of cattle, if properly preserved and applied to the purposes of vegetation, is greater than that of all the dung which the same animals would yield ! A letter from Charles Alexander, near Peebles, in Scotland, addressed to Sir. John Sinclair, in 1812, contains much valuable information on this subject. "This intelligent farmer had long been impressed with the great importance of the urine of cattle as a manure, and he set about to discover, by a long and well-conducted series of experiments, the best method of collecting and applying it. He began by digging a pit contiguous to the feeding-stall, but distinct altogether from that which was appropriated for the reception of the dung. The dimensions of this pit, were thirty-six feet square and four feet deep, surrounded on all sides by a wall ; and the solid contents were one hundred and ninety-two yards. Having selected the nearest spot where he could find loamy earth, and this he always took from the surface of some field under cultivation, he proceeded to fill it; and found that with three men and two horses, he could easily accomplish twenty-eight cubic yards per day; and the whole expense of transporting the earth did not exceed twenty-two dollars. When the work was complete, he levelled the surface of the heap in a line with the sewer which conducted the urine from the interior of the building, on purpose that it might be distributed with regularity, and might saturate the whole from top to bottom. The quantity conveyed to it he estimates at about eight hundred gallons. The urine was supplied by fourteen cattle, kept there for five months on fodder and turnips. The contents of the pit produced two hundred and eighty-eight loads, allowing two cubic yards to be taken out in three carts; and he spread forty of these on each acre, so that this urine in five months, produced a compost sufficient for the fertilization of seven acres of land. He states farther, that he had tried this experiment for ten years, and had indiscriminately used in the same field either the rotted cow-dung or the saturated earth; and in all stages of the crop, he had never been able to find any perceptible difference. But what is still more wonderful, he found his compost lasted in its effects as many years as his best putrescent manure; and he therefore boldly avers, that a load of each is of equivalent value.

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* See Davy's Agricultural Chemistry.

"It appears, then, that in five months each cow discharges urine which, when absorbed by loam, furnishes manure of the richest quality and most durable effects for half an acre of ground. The dung-pit, which contained all the excrementitious matter of the fourteen cattle, as well as the litter employed in bedding them, and which was kept separate for the purpose of the experiment, only furnished, during the same period, two hundred and forty loads, and these, at the same rate, could only manure six acres. The aggregate value of the urine, therefore, when compared with that of the dung, was in the ratio of seven to six."*

We apprehend that the farmers of the United States are not, generally speaking, careful to turn the urine of their cattle to account for manure. There are some cultivators, however, who have taken measures to secure this substance, and to apply it to useful purposes. Mr. Robert Smith, of Baltimore, has his stables constructed in such a manner that all the liquid discharges of his cattle are conducted, together with the wash of the barn-yard, into a cistern, pumped into a hogshead, and applied in a liquid state to the soil which it is wished to manure.† This mode of making use of this substance is likewise recommended in the "Code of Agriculture," as follows: "The advantages of irrigating grass lands with cow urine almost exceed belief. Mr. Harley, of Glasgow, (who keeps a large dairy in that town,) by using cow urine, cuts some small fields of grass six times, and the average of each cutting is fifteen inches in length. There are disadvantages, however, attending this mode of applying this powerful manure. It must be applied soon after it is formed, or oftentimes the putrefactive process will commence, and deprive it of a part of its efficacy. And as urine is of a scorching quality, it is unsafe to apply it to growing crops in great heat or drought. Hence it is unadvisable to use it, except for grass, after the month of April or May, unless diluted. It is particularly useful in the spring, when the application of liquid manure gives a new impetus to the plant, and makes its growth more vigorous. This manure forces newly planted cabbages in a most remarkable manner."

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* Letters of Agricola. † See New England Farmer, Vol. I No. 6. p. 41

If it be true that more manure can be obtained from the stale of cattle than from their dung and litter, in the proportion of seven to six, (as would seem by Mr. Alexander's experiments as above detailed,) and that by our common modes of husbandry this stale is nearly or quite squandered away, the discovery is of very great importance indeed to agriculture. It is nothing less than a method by which farmers may, with a small expense, somewhat more than double their usual quantity of stable manure. And if farmers should "value manure as a miser does his strong box, should grasp after and hoard it as eagerly and anxiously as a covetous man accumulates treasure,"* surely the wise cultivator will not grudge some labor and expense to acquire more than double the usual quantity of so valuable an article. It is very true there are many things to be taken into consideration in all these economical processes. A principal inquiry should ever be, whether the saving will cost more than the benefit arising from it will be worth. Many improvements which are highly valuable in old and populous countries, where labor is cheap and land dear, cannot be advantageously adopted in this country, where the object, in general, is rather to make the most of our labor than of our land. It is to be recollected, likewise, that in New England, during a considerable part of the time in which cattle are usually housed, the liquid manure is soon converted into ice, and in that state must be transferred to the dung-heap, or inconvenient accumulations will take place before a thaw would render it practicable to separate the liquid from the solid parts of the manure. Still, with all these disadvantages, we believe, in most cases, it is highly advisable to preserve the liquid portion of stable manure separate from the solid part;

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* These expressions, we believe, belong to the Hon. Mr. Peters, of Pennsylvania, but we do not recollect where we found them.

especially where cattle are soiled or horses stabled during all or the greater part of the year.

Manure for Grass Grounds, Top-dressings, &c. An intelligent and scientific cultivator has given the following directions on this subject.

There is scarcely any question on which farmers are more divided than as to the policy of applying manure as a top-dressing to grass lands, in the spring or fall. The reasoning seems to be in favor of spring dressing, and it is supported by many excellent names. But it ought to be known, that intelligent farmers near the metropolis most generally dress their lands in autumn. Besides the reason stated above, that grass lands are less injured by carting over them in the fall, it may be added, that it is a season of greater leisure; and although it is confidently asserted, that the manure is wasted by rains and snows, yet much ought to be allowed on the other side for the protection afforded by the top-dressing to the tender roots of the plants during winter; and ought we not to add something for the low temperature of the atmosphere in winter, which prevents evaporation? Whatever principles of fertility exist in manure, are in winter carried down into the soil. We are fully convinced that a scorching sun and drying air are more pernicious to manures spread thinly over the surface than any drenching rains can be, unless on declivities, where top-dressings are unquestionably of less value than on level grounds. The fact that farmers who grow rich by supplying the great towns with hay generally adopt the practice of fall-dressing their grass lands, deserves weight.

Top-dressing should not be used in the fall for winter grain, because they would be apt to make the young plants come forward too fast and grow so rank that they would be liable to be winter-killed. Top-dressing for wheat, rye, &c. should be applied to the growing crop in the spring or early in the summer, when it is suspected that the land is not rich enough to bring a full crop to perfection.

With regard to the materials for dressing your grass grounds, after your garden is supplied with manure, you may as well cart on to your mowing land all that you can collect from your barn-yards, your stercoraries or dung-heaps, hog-pens, compost beds, night soil, &c. All sorts of dung, however, before being applied to grass land, should be well mixed with loam, sand, or some kind of earth which will imbibe the gas or effluvia of the dung or putrescent manure

We have said before, in substance, that all kinds of putrescent manure (that is, those animal or vegetable substances which are liable to putrefy, mould, and be wasted when exposed to the sun and air) are in a great measure thrown away, if applied to the surface of the soil before being made into compost.* "Spreading putrescent substances upon the surface of a field of grass ground, is to manure, not the soil, but the atmosphere; and is justly condemned as the most injudicious plan that can be devised, in an arable district."† If dung not made into compost nor mixed with earth or any substance which will attract and imbibe its gas, effluvia, volatile products, or (to be more plain) that which causes it to smell unpleasantly, be applied to a field of plough land, it ought to be spread evenly and ploughed, or at least harrowed in immediately. If a farmer's chief dependence is in grazing land, and he has dung, or putrescent manure not made into compost, to apply, we would suggest it for his consideration whether it might not be well, first to spread his dung as evenly as possible over his field, and then spread over the whole at least an equal quantity of good earth or loam. By such means a compost is made in the field after the putrescent manure is applied, and the earth or loam spread over the dung will not only absorb its gaseous products, but in a great measure protect it from being dried by the air or scorched by the sun, till its fertilizing qualities are dissipated. This method of managing with top-dressing for grass land, however, we should suggest merely as an expedient for the saving of labor in cases where farmers have much dung, but little plough land in proportion, and with whom the saving of labor is a very great object. As a general rule, the following maxim of Sir John Sinclair will apply as well in this country as in Great Britain. "There are strong objections to the application of dung to grass lands; (much of its strength being evaporated, from its being exposed to atmospheric influence;) *composts are greatly to be preferred.* They may be applied at the rate of from thirty to forty cubic yards per acre. To keep grass land in good condition, a dressing to this amount is required every four years. The application of unmixed putrescent manure will thus be rendered unnecessary."

The mode in which some farmers manage with regard to manuring their grass lands is not only absurd, but ruinous. Early in the fall they cart their dung from their barn-yards and sties, which perhaps had been a year or more accumulating, and of course is finely pulverized and ready to take the wings of every breeze. They place it on a tough sward in little heaps about the size of a two bushel basket. The sun, high winds, rain, and drying atmosphere, all conspire to rob these little heaps of nearly all their fertilizing qualities, and leave little but a dead mass of matter as "dry as a husk." Late in the spring, and generally during or just before a dry time, Mr. Cultivator spreads these little heaps (reduced by exposure to wind and weather to about the size of a half bushel measure) over the sward. If the season proves dry, the manure, particularly that part which was collected from the stye, has scarcely any other effect than to assist the sun in scorching the grass. In the mean time the arable land, being left destitute of manure for the sake of *dunging* the grass ground, yields not half a crop. The poor farmer believes his land worn out, and thinks it high time to "pluck up stakes and be off to the Ohio!"

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* New England Farmer, Vol. p. 321.

† Code of Agriculture.

Unless you have plenty of manure, you had better not apply any dung to your high, gravelly, or sandy soils, but dress them with plaster of Paris. Uneven grass grounds will not admit of top-dressing to any advantage, on account of the manure's being liable to be washed away.

Previous to manuring your grass lands, it will be well to harrow or scarify them. "Rolling was formerly considered to be indispensable in the management of grass lands, tending to smooth and consolidate the surface, to prevent the formation of ant-hills, and to render the effects of drought less pernicious. But *scarifying* the turf with a plough, consisting only of coulters, or with a harrow so that the whole surface may be cut or torn, is to be recommended when the pastures [or mowing land] are hidebound. That tenacious state, rolling tends to increase; whereas by scarifying, the surface is loosened, and the roots acquire new means of improved vegetation. This operation seems particularly useful when it precedes the manuring of grass lands; for if well scarified, the ground is so opened, that any manure spread upon it gets at once to the roots; consequently a small quantity thus applied, goes as far as a larger one laid on in the old mode, and without such an operation. Thus the force of the objections to the application of putrescent manure to grass lands is in some degree obviated."* After such process it may be well to sow grass seeds, to produce a new set of plants, and supersede the necessity of breaking up the soil to prevent its being "*bound out*," as the phrase is

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* Code of Agriculture.

It is a bad practice to feed your mowing land very closely in the fall. There should be enough of the after-grass left to protect the roots of the grass against the frosts of winter. We have known good farmers who would not suffer their mowing land to be pastured at any time of the year. But if the soil be well dressed with manure it can do but little or any injury to pasture it in the fore part of autumn, taking care not to let cattle run upon it when wet, and so soft that they would make much impression on it with their feet.

Manure from Swine. Very valuable manure, with a little attention, may be obtained from swine by methods similar to that described by a writer for "The New England Farmer," (Vol. II. p. 178,) as follows:

"I usually keep and fatten four hogs in a year. These I keep confined in a yard twenty feet square, with a warm and convenient shed attached thereto as a shelter for them during the night time, and in cold and stormy weather. Into their yard I put the scrapings of ditches, the dirt which is continually collecting in and about the dwellinghouse and other buildings, together with the straw with which they are littered, frequently clearing it out of their house and granting them a fresh supply. During the summer season I often throw in large quantities of weeds, brakes, and other rubbish that may come to hand, which helps to increase both the quantity and quality of the manure. In this way I make from twenty-five to thirty loads of manure in a year, which answers a more valuable purpose than that which I take from the stable or barn-yard.

"I planted a field containing two acres with corn. One half of the piece was manured in the hill with ten loads from the hogpen, the other half with the same quantity of the best manure the barn-yard afforded. A visible difference was to be seen in the growth of the corn through the season, and at the time of harvest the difference was still more discernible. That part manured from the hogpen produced ears generally much larger than that manured from the barnyard, a great proportion of the stalks bearing two, and many of them three ears each. Having harvested and measured my corn, I found the result to be as follows: the produce of the part manured from the hogpen fifty bushels, while that of the other part was but forty-two bushels, making a difference of eight bushels in favor of the former.

Manures may be divided into two classes. The one is called animal and vegetable or putrescent manures. They consist of decayed and decaying animal and vegetable substances. The other class is denominated fossil manures. The last mentioned do not properly constitute the food of plants, although they enter into the composition of vegetables in minute quantities. Fossil manures stimulate plants, and cause them to take their food faster than they otherwise would. They are like what medical men call *condiments*, and answer the same purpose, as respects the economy of vegetables, which salt, pepper, spices, &c. effect as regards the animal economy.

The principal fossil manures are lime, gypsum, and marl. We shall make a few observations on each.

1. *Advantages of Lime.* Though there are exceptions to the rule, yet, in general, it may be confidently asserted, that, unless where a soil has by nature enough of calcareous matter in its composition for the purposes of vegetation, it can neither be brought into its most fertile states, nor will other manures be so useful as they ought, if lime or some other calcareous earth be not previously applied. By lime spread upon a moory soil, good herbage is produced where nothing but heath and unpalatable grasses grew before. By the same means, grass lands, instead of yielding nothing but bent, and other inferior grasses, have been covered with those of a more valuable description. The utility of lime to turnips is so great, that, though in the same field, where no lime had been applied the crop died away, yet in the limed part the turnips flourished with unabated vigor. On the Mendip lands in Somerset, by the application of lime, the value of land was raised from four shillings to thirty shillings per acre; and dung, which previous to liming had no sensible effect, operated after its application as on other lands. Macclesfield forest in Cheshire, and vast tracts in the northern and more elevated parts of Derbyshire and adjacent districts, have been astonishingly improved by the same means The rye lands of Herefordshire in 1636 refused to produce wheat, peas, or vetches; but since the introduction of lime, they have been so fertilized, as to be successfully applied to the growth of every species of corn. In maiden soils of a tolerable quality, the richest manure will not enable them to bring any crops, but those of oats or rye, to maturity;

whereas, if they receive a sufficient quantity of lime, crops of peas, barley, or wheat, may be raised to advantage. The benefit resulting from the use of lime has been indisputably proved in the same farm; for the richer parts that were left unlimed were uniformly inferior in produce to the poorer that had been limed, during a period of not less than twenty-one years, under the same course of management.

2. *The principles on which lime operates as a manure.* Quicklime in powder, or dissolved in water, is injurious to plants; hence grass watered with lime-water is destroyed. But lime freshly burnt, or slacked, forms a compost with vegetable matter, which is soluble in water, and nutritive to plants. Mild lime (as chalk, or quicklime again impregnated with carbonic acid) chiefly operates by improving the texture of the soil and its relation to absorption.

3. *The various sorts of Limestone.* Sometimes limestone is almost perfectly pure, as is the case with marble, which frequently contains scarcely any other substance but calcareous matter. Several sorts of limestone, however, have mixtures of clay and sand, in various proportions, by which the efficacy of the manure, in proportion to the quantity of these substances, is considerably diminished. It is necessary, therefore, to analyze limestone, to ascertain the proportion of pure lime, before it is advisable to use so expensive an article in great quantities, more especially if it must be conveyed from a distance. Bituminous limestone makes good manure. But the magnesian is the species which requires the greatest attention. Limestone sometimes contains from 20.3 to 23.5 of magnesia, in which case it would be injurious to weak soils to apply more than from twenty-five to thirty bushels per statute acre, though in rich soils double that quantity may be used, and still more with peat, on which soil it would have a most powerful effect in producing fertility.

4. *Mode of preparing it for use.* Limestone is burnt in kilns of various constructions. It is applied with advantage to soils recently reclaimed in a caustic state; but is generally *slacked*, by throwing water upon the lumps, until they crack and swell, and fall down into a fine powder. This operation, when it is to be done, should not be delayed; for if properly burnt, calcined lime is easily reduced into a fine powder, which may not be the case if the slacking be postponed. If water cannot easily be obtained, the lumps may either be divided into small heaps and covered with earth,

by the moisture of which they are soon pulverized, or made into large heaps, the lumps and earth six inches thick, and the whole covered with earth. Where it can easily be had, it is a great advantage to slack the calcined limestone for manure with sea-water or urine. When applied to land in a powdery state, lime tends to bring any hard vegetable matter that the soil contains into a more rapid state of decomposition and solution, so as to render it a proper food for plants.

5. *Application.* Summer is the proper season for liming land. That experienced farmer, Mr. Rennie of Phantassie, is of opinion, that the most profitable period for applying lime is when the land is under summer fallow, in the months of June and July, that it may be completely mixed with the soil before the crop is sown. This is also the general practice in other districts. For a turnip crop, it should be laid on early in the spring before the turnips are drilled, in order that the lime may be thoroughly incorporated with the soil, by the ploughings and harrowings it will receive ; the land will thus have time to cool, and the lime will not dry up the moisture necessary for bringing the turnips into leaf. For potatoes, lime is not to be recommended, as it is apt to burn and blister their skins. When applied to old ley, it is a good practice to spread it on the surface previously to the land being broken up, by which it is fixed firmly on the sward. One year has been found of use ; but when done three years before, it had produced still greater advantages ; in the former case, the increase of oats being only at the rate of six to one, and in the latter, that of ten to one of the seed sown. The quantity applied must vary according to the soil. From two hundred and forty to three hundred bushels of unslacked lime may be applied on strong lands with advantage. Even six hundred bushels have been laid on at once, on strong clays, with great success. On light soils, a much smaller quantity will answer, say from one hundred and fifty to two hundred bushels ; but these small doses ought to be more frequently repeated. When applied on the surface of bogs or moors, the quantity used is very con siderable, and the more that is laid on, the greater the improvement. The real quantity, however, of calcareous matter used, depends upon the quality of the stone. It often happens, that five chaldrons do not furnish more *effective manure* than three, because they do not contain three-fifths of calcareous matter.

6 *Effects of Lime.* Many farmers have subjected themselves to an expense at the rate of ten shillings per acre per annum for the lime they used, and have been amply remunerated. The benefit derived in the cultivation of green crops is sufficient for that purpose. Such crops may be raised by large quantities of dung; but where calcareous substances are applied, it is proved, by long experience, that a less quantity of animal and vegetable manure will answer the purpose. This is making the farm-yard dung go farthor, with more powerful and more permanent effects; and from the weightier crops thus raised, the quantity of manure on a farm will be most materially augmented. Indeed, upon land in a proper state for calcareous application, (as old ley,) lime is much superior to dung. Its effects continue for a longer period, while the crops produced are of a superior quality, and less susceptible of injury from the excesses of drought and moisture. The ground likewise, more especially if it be of a strong nature, is much more easily wrought; and, in some instances, *the saving of labor alone* would be sufficient to induce a farmer to lime his land, were no greater benefit derived from the application than the opportunity thereby gained of working it in a more perfect manner.

7. *Rules for the management of Lime.* 1. It is necessary to ascertain the quality of the soil to which lime is proposed to be applied; and whether it has formerly been limed; and to what extent. In general, it may be observed, that strong loams and stubborn clays require a full dose to bring them into action, as such soils are capable of absorbing a great quantity of calcareous matter. Lighter soils, however, require less lime to stimulate them; and may be injured by administering a quantity of lime recently calcined, that would prove moderately beneficial to those of a heavy nature. 2. As the effects of lime greatly depend on its intimate admixture with the surface soils, it is expedient to have it in a powdered state before it is applied, and the drier and the more perfectly powdered the better. 3. Lime having a tendency to sink in the soil, it cannot be ploughed in with too shallow a furrow, or kept too near the surface. 4. Lime ought not to be applied a second time to weak or poor soils, unless mixed with a compost; after which the land should be immediately laid down to grass.*

The following, on the "Stimulation of Soils," was written by the Hon. John Welles, of Boston, and published in the New England Farmer.

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* Encyclopædia of Agriculture.

"From a frequent perusal of the benefits derived from lime in its application to soil in Europe, I have been induced for more than a score of years, successively, to make use of it for agricultural purposes, to the extent of more than one hundred casks annually.

"One of my first experiments arose from a desire to give a top-dressing to a piece of land, which it was otherwise inconvenient to do. The soil was a heavy black loam. Having a quantity of black earth from a trench, (or top stratum,) I procured a quantity of lime. A bottom of four or five buck loads of earth was first placed; then a couple of casks of lime were spread thereon; then earth and lime again, till my materials were used, or the quantity needed was had, at the rate of eight or ten casks to the acre; thus a cask being supposed to produce about five bushels of slacked lime, the cost of which, if the casks are swelled and the lime partly slacked, is eight to ten cents a bushel. This is the most moderate application in Europe, and the cost is about the same.

"This mixture, after lying twelve or fourteen days, was shovelled over, and after some days being found fine and well mixed, was spread from the cart on the ground. To my *surprise*, I found the effect produced to be equal to what is usual from common compost manure!

"In England, where lime is most used for agricultural purposes, it is considered that in its crude state, or uncalcined state, it is most beneficial, if pounded or made fine. This, where limestone abounds, it is well to know; but there is little of it in this neighbourhood. Encouraged by this experiment, I continued to purchase and apply considerable quantities of damaged and air-slacked lime * in my cultivation, particularly for a low, flat piece of land. This being intersected with small ditches, furnished the earth I was not able otherwise to procure to mix with the lime It is not well, however, in such cases, to lower the surface by taking off more than will keep the ditches open. When the earth is tough with sward, &c., it may be made finer by being carted out and put in heaps on the ground, and spread afterwards. Indeed this is done to great advantage in the winter; the poaching the land, or making a rough surface for the scythe, being then well avoided.

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* Lime long exposed to the air, such as sweepings of stores, &c., is of less value and more cheaply obtained.

"As this land cannot advantageously be ploughed, I have, in applying every third year a top-dressing, as my custom is. alternated, giving first a dressing of earth and lime, and at the expiration of three years, a coat of compost manure.

"This has been done on the principle that a more judicious mixture would be made, and a better composition of soil be had. I have been guided herein from general reasoning, not from any proof that the lime might not be repeated.

"It seems, however, to be a prevailing opinion, where lime has been most in use, that it opens the sod and makes it more porous, giving thereby a better action tc other manures, which a judicious husbandry should in succession apply. In this application of lime to a grass sward, in a deep springy soil, I have been for a long time well satisfied It was several years before I undertook the same practice on a light soil, and I did it with less expectation. But I was somewhat surprised to find it equally beneficial.

"So far lime has been mentioned as a compenent article in top-dressing for a green sward. Its effect will be shown on ploughed land, and in a grain crop.

"With a view of increasing fertility, I frequently have applied on the *side* of the hills of Indian corn a small handful of slacked lime. I so placed it, lest the caustic quality of the lime should prove injurious to the tender plant when it first started from the soil. This is my opinion and practice; though I have often since seen large pieces slacken and expand on the soil without injury to the grass, which in a lively green color pierced through it. This application of lime to the hill I continued for some time, and though small in quantity or effect, I still thought it of *some* advantage. I was led, however, to a more extensive and satisfactory experiment.

"I had a piece of ground of about four acres, of rather light soil, which gave promise of a very small crop of grass. Being without the means of obtaining manure, as I had a quantity of earth of the top stratum, taken up on building a wall, I forthwith procured a quantity of lime and mixed it in the manner before mentioned. About the middle of June I had the grass mowed and the land ploughed. The lime compost was then spread and lightly harrowed in. An early sort of yellow corn, which when ripe husked itself, was procured. And my neighbours, who knew the process, were, in the fall of the year, much surprised by the stout ears of golden grain thus unfolded to view !

"It has been observed, that if lime is a fertilizer of soil, why is it that where it abounds and often forms an under stratum a greater fertility does not prevail ? To this it may be answered, that lime is a constituent principle, it is believed, in all soil, and may be supplied, where from experience a deficiency is found. But when it superabounds, as in most other things, excess may be injurious. In all this more experience is wished for, as the only safe and profitable guide."

The following is extracted from a letter from Daniel Buckley, Esq., of Salisbury, Pennsylvania, to J. Buel, Esq. published in "Memoirs of the New York Board of Agriculture," Vol. III. p. 124.

"The land which I cultivate, according to M'Clure's treatise, is transition, composed of white and yellow clay and limestone, much of the latter appearing on the surface, intermixed with flint. Upon this soil I have made a liberal use of lime, ever since the year 1790, and think I have been well rewarded for the expense and labor, by the increased value of my crops.

"The method of applying the lime which I have adopted in common with my neighbours is, in the first place, to plough up a sod field with a strong team, in the spring or fall; harrow it the way it is ploughed, and mark the field into as many squares as you intend to put on half-bushels, say one hundred on the acre, which will bring the furrows about twenty feet apart each way, and require fifty bushels to the acre. This quantity I have found to be most profitable. When the lime is burnt, and as soon as it is cool enough to handle, it ought to be hauled on the land already marked, and a half bushel deposited in the centre of each square, in as compact a heap as possible. If water is convenient, I prefer to slack the lime immediately, rather than to wait for rain, as it becomes finer and can be more evenly spread. As soon as it has slacked, it is immediately spread and well harrowed. This method I prefer for Indian corn, barley, oats, rye, and potatoes. On all the above crops I have experienced a great benefit from lime the first year after its application. With potatoes I add about fifteen two-horse loads of barn-yard manure to the acre, before planting. A second liming is often given, and much approved of, after an interval of three or more years. This amalgamates better, and can be more intimately mixed with the soil.

"There are good farmers who differ as to the quantity of lime that is most profitably applied; some say sixty bushels on the acre, some seventy, and some more. I have applied one hundred on an acre of limestone land, at a dressing; but have not been able to discover any benefit from using it thus freely, nor any injury except in the loss of lime.

"Wheat seldom receives any benefit from lime until the second or third year after it has been applied, except it has been mixed in a compost of yard manure and earth. This method is much practised in the lower counties of this State; though not by good farmers, until they have applied lime as the basis of melioration. By this management they have raised their lands from an impoverished state, produced by injudicious cropping, to such a state of fertility, as, I am informed, to enable them to fatten a bullock of six hundred weight on an acre, and to cut grass from the same acre sufficient to winter another.

"Sandy soils are greatly improved by the use of lime. I lately purchased some of that kind, which was originally covered with chestnut timber, and was called mountain land. It has been cleared seventy years; but lying a distance from the farm buildings, had never received any manure but a dressing of lime. This land I have had repeatedly farmed since I owned it; and although to appearance it seemed to be almost a *caput mortuum*, with the aid of ten or twelve four-horse loads of the gleanings of a yard of a public house, it has produced as much, and as good wheat, rye, oats, timothy, and clover to the acre, as any land in the township in which it lays. I consider the liming which it had fifty years ago as the principal cause of its fertility.

"It is a general opinion amongst good farmers, that liming should be repeated every ten or fifteen years, and that the increased crops richly compensate the expense. It matters very little how it is applied, provided it is evenly spread immediately after it is slacked. If suffered to air-slack, or to lie after it has been water-slacked, it re-imbibes carbonic acid, which the fire had expelled, becomes lumpy, and is more difficult to be incorporated with the soil. Some spread it upon the sod and plough it under, and think they have as much profit from it in this way as in any other. When thus applied, it powerfully contributes to decompose the tougher fibres of the sod, and to convert them into nutriment for the crop."

Gypsum, or Plaster of Paris. It is said, that the properties of gypsum as a manure were first discovered in Germany, by a laborer, at a quarry of that substance. In passing across a meadow to shorten the distance home, he observed the luxuriance of the grass where he had walked, and supposing it to be caused by the dust of the gypsum from his feet and clothes, made experiments, which verified his supposition.

Great differences exist among agriculturists respecting the uses of gypsum and the manner of its operation. Some have supposed that its efficiency as a manure is altogether owing to its power of attracting moisture from the air. But Sir Humphrey Davy expressed an opinion, that but little effect can be produced by such attraction. "When combined with water," he observed, "it retains that fluid too powerfully to yield it to the roots of the plant, and its adhesive attraction for moisture is inconsiderable; the small quantity in which it is used likewise is a circumstance unfavorable to this idea." Some have supposed that gypsum assists in the putrefaction of animal substances, and the decomposition of the manure in the soil. This philosopher however, proved by repeated experiments, that it rather retards than accelerates putrefaction. He likewise says, "In examining the ashes of sainfoin, clover, and rye grass, I found that they afforded considerable quantities of gypsum; and this substance probably is intimately combined as a necessary part of the woody fibre. If this be allowed, it is easy to explain why it operates in such small quantities; for the whole of a clover crop, or sainfoin crop, on an acre, according to my estimation, would afford by incineration only three or four bushels of gypsum. The reason why gypsum is not generally more efficacious, is probably because that most cultivated soils contain it in sufficient quantities for the use of the grasses. In the common course of cultivation gypsum is furnished in the manure; for it is contained in stable dung, and in the dung of cattle fed on grass. Lord Dundas informs me, that having tried gypsum without any benefit on two of his estates in Yorkshire, he was induced to have the soil examined for gypsum, and this substance was found in both soils."*

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* Elements of Agricultural Chemistry, Lecture VII.

It has been made a question, whether burning and calcining gypsum make any difference with regard to its fertilizing properties. This is said to be the practice among French cultivators, and was likewise recommended by Dr. Deane. But an English writer on agriculture observes, that "calcining is not likely to make any difference, because the sulphuric acid in gypsum cannot be expelled by the most violent heat of the furnace; and an experiment of Arthur Young countenances the assertion, that the effects of gypsum are the same, whether calcined or rough."

Dr. Joseph E. Muse, of Maryland, in an essay on the subject of gypsum, and its mode of operation, published in the "American Farmer," (Vol. I. p. 338,) gives it as his opinion, "that the chief, if not the only cause of the efficacy of gypsum in promoting vegetation, is to be found in its tendency to become phosphoric," and produced many facts and deductions therefrom, to show that gypsum by exposure to the atmosphere becomes phosphoric; and that phosphorus exists in vegetables.

The late Dr. Gorham, in a paper read before a Society in Boston, observed, "When plaster of Paris is applied to the seed it stimulates the little root, the action of the vessels is thus increased, absorption goes on more rapidly, and it acquires more nourishment for a given time than in ordinary circumstances; the consequences are a quick growth and enlargement of the organs."

Colonel Taylor, of Virginia, observed, in substance, that he sows of plaster from three pecks to one bushel to the acre. Sown on clover in the spring, it benefits it considerably. The best way of using it is in the spring upon the long manure of the preceding winter, to be ploughed in with it. He thinks it a valuable ally, but by no means a substitute for manure. That there should be intervals of two, three, or four years between applying it to the same land. That its effect is graduated by the quantity of vegetable matter on which it is sown. That on closely grazed land it does little good at first, and repeated would become pernicious; and that it must be united either with long manure of the winter, or the ungrazed vegetable cover produced in the summer. That all crops are ultimately improved by its improving the soil, even when its effects are not immediately visible; but he does not recommend it as a top-dressing, except for clover

M. Canolle, a French writer, observes, that plaster, acting chiefly on the absorbent system of plants, its effects are not like those of manure buried in the soil, which act principally on the roots. The latter, according to their *particular nature*, divide, soften, enrich, warm, or stiffen the sods with which they are mixed. The quantity of plaster spread upon the land is so trifling that it can have little effect on the soil. I speak from experience. Plaster buried in the earth where sainfoin has been sown, has produced little alteration; whilst the same quantity of plaster spread over the same surface of sainfoin has produced the most beautiful vegetation.

"From this experience, so uniform in the application of plaster, I am led to believe, that one must consult as well the nature of the soil, as the kind of plants to which we apply plaster. Thus, whatever may be the soil, on which clover, lucerne, and sainfoin naturally flourish vigorously, or with that vigor which encourages us to apply manure, there is no risk in trying plaster.

"It is to be remarked, that plaster operates on plants in a direct ratio to the size and number of their leaves. I have spread plaster on land where sainfoin was mixed with the common grasses which compose our meadows. The growth of the sainfoin and wild honey-suckle has been beyond comparison greater than that of the common grasses. It is to this cause I attribute the failure of success on grass ground chiefly filled with common grasses. I have a field of lucerne separated from a natural meadow only by a brook. I have greatly increased the lucerne by the plaster, whilst the effect of a like quantity on the adjoining grass land was scarcely, if at all perceivable.

"It has been ascertained by repeated experiments, that a liberal application of plaster to clover, at the time of turning it down and preparing for a wheat crop, is by far the most advantageous to the crop, and much preferable to turning in the clover in the usual way, and plastering on the surface. The action of the plaster, thus excluded from atmospheric air, upon the clover, covered over, is instantaneous, and the putridity is so certain as to cause considerable gas, which in its passage through the clod impregnates it with all its manuring qualities, and the root of the plant shoots down and feeds on a bed of manure."*

A writer for "The New England Farmer," (Vol. II. p.

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* American Farmer.

10,) states, in substance, as results of his experience, that plaster was found by him to be useful as manure, after having been kept on hand in a box seven years; that its beneficial effects on pasture land are very great. He sows it on the same piece of ground every second year, and thinks five or six pecks to an acre are sufficient; that his pasturing is essentially improved by that application, producing nearly double the quantity of food which it formerly did; that sowing plaster on his grazing land had a tendency to destroy the bushes, by giving increased luxuriance to the grass; that this manure has been found very useful for flax and potatoes, &c.

Dr. Cooper, editor of the last Philadelphia edition of "Willich's Domestic Encyclopedia," says, "Gypsum will not answer beyond two and a half bushels to the acre; one and a half bushel is better. It will not answer on wet or swampy, or clayey soils. It should be scattered over the ground as a top-dressing. Suppose you were asked if a stone brought you is gypsum. 1. Gypsum can be scratched by the nail, scraped by a knife, ground by the teeth. 2. It will not dissolve in spirits of salt as limestone will; nor is it half so hard as limestone. 3. Its color and crystalline appearance distinguish it from clay; nor does it give a clayey odor when breathed upon, unless clay be mixed with it. 4. Powder it, boil it to dryness, with four times its weight of pot or pearlash. Wash out all that the hot water will dissolve; the remaining powder (if the stone be gypsum) is carbonate of lime."

Gypsum has been highly recommended as a manure for potatoes. The potatoes, just before planting, should be wet and rolled in pulverized plaster; and a handful of plaster applied immediately after the first and second hoeing to the leaves, and scattered over the hill.

A writer for "The Genesee Farmer," with the signature "Onondago," observes, "Plaster is always to be sown on wheat unless the land is wanted for a spring crop the next year, after clover seed, at the rate of one, two, or even three bushels per acre. After harvest the young clover ought not to be pastured much, if any; the next year the clover is suffered to grow as large as it can be, and be well turned over, which is then done, the ground fallowed and the wheat sown; the next year sow the clover seed and plaster and so on from year to year *ad infinitum*, the land always getting better, as is supposed by those who practise this method. Plaster we think should be sown in pasture. An old farmer, and one who has proved his skill by making a fortune at the business, and who now tills nearly five hundred acres, told me, that a ton of plaster sown on ten acres of pasture would make it yield as much as fifteen acres under the like circumstances without plaster."

J. Spicer, in "Goodsell's Farmer," says, "When I apply plaster to corn, which I have done for nearly three years past, I mix it with one-half leached ashes, as they are leached for common family use; put it in a cart, and shovel and mix it well. I then put one gill to the hill immediately after the first hoeing, and the same thing over after the second hoeing. I have tried the same quantity of clear plaster, side and side, twice, and find the mixture to produce the greatest effects."

The Hon. J. Lowell, in an article published in "The New England Farmer," (Vol. V. p. 1,) contradicts an idea which has been generally prevalent, that gypsum is of no use to lands near the seacoast, and observes as follows:

"I shall set out with the fact, that plaster has been used with success on lands on the seacoast of France, where the southwest wind, the prevalent one in summer, in that country, brings with it the ocean air: and in our country, in Massachusetts, for example, the prevalent winds do not bring with them an atmosphere filled with saline particles. It cannot therefore be the vicinity to the sea which renders gypsum inert and inefficacious with us. The cause of its inefficacy near the seacoast, must therefore be sought for in something else; in the nature of our soil, perhaps already sufficiently imbued with the constituent parts of gypsum, or in our more free use of stable manure, which furnishes the plants with all the food they require.

"I have been in a constant and invariable course of experiments on plaster, and these are the results. It seems to be of no use, *ever*, to *clover*, on low meadow lands; of no use to *any* plants on a good rich, well-manured soil. But I have three decisive proofs of its utility on dry, hilly, gravelly soils.

"The first I shall mention, was an experiment made by the late R. S. Esq., of Roxbury, on a lofty hill of old pasture land. He applied it for several years, and his own conviction was, and it was also the full conviction of many others, that it materially improved the condition of his pasture. It was green at an earlier period, and the white clover came into it more generally and luxuriantly than into other lands in the same situation.

"Seven years since, I applied plaster to a newly laid down field of clover, one half of which was a dry, gravelly knoll, with very little vegetable soil. When it was fit for cutting, I showed it to the trustees of the Massachusetts Agricultural Society, and without pointing out to them the part to which the plaster had been applied, they at once, on sight of it, detected and pointed out the superiority of the crop on the part to which the gypsum had been applied; and their designation agreed, by metes and bounds, with the stakes I had driven, indicating the part to which plaster had been applied, and which were then concealed by the grass. This superior crop was on a pure gravelly soil, far inferior to the rest, which was a deep rich loam.

"This year I had a piece of clover in its second year of growth. It was similarly situated. Two thirds of it was a gravelly, thin soil. I cut the whole on the 10th day of June. The gravelly part, owing to the drought, did not yield more than half a ton to the acre; the rich part an excellent crop. As soon as the hay was in, I gave a dressing of plaster to the gravelly knoll *only*, at the rate of three bushels to the acre.

"The effect has been as great as has ever been represented to be produced by gypsum by persons in the interior. The second crop on the gravelly land is *far superior* to that on a rich and deep soil in the *same* field. It may be discovered at ten rods' distance; and you can mark by your eyes precisely the line of the ground to which the plaster was applied.

"Gypsum is of no service on low lands, or on good land, nor of much use to any products except to clover and lucerne; but on sandy and gravelly soils, and applied to these plants, especially in dry seasons, I am convinced it will prove valuable. I paid only four dollars for ten bushels, ground; and I applied only sixty cents' worth to this land, and am convinced, that the plaster will increase the value of the second crop to five times the cost of the application."

A writer for "The Genesee Farmer," with the signature "V. W. S.," recommends to sow plaster from the box of a wagon, driven slowly over the field in which it is to be distributed. He sowed five and a half bushels of plaster over four acres of meadow in just an hour, and performed his work *well*, sowed the ground twice over, extending the cast each time to the track the wheels last made, by which the driver guided his course across the lot. The writer recommends a windy day for his purpose, and believes a yoke of cattle might be preferable to a horse. He says:

"It will be readily perceived, that while my mode of sowing plaster makes a great saving of manual strength, the great advantage derived from it is, in the expedition with which the process is performed. One man and boy, in a one-horse cart, can dress from forty to sixty acres per day; thus making a very important saving of time, at a season when the farmer is obliged to husband closely. The injury of driving a wagon over a field of grain would be but little, and could not be considered a moment, when compared with the value of the time gained. In sowing from a wagon it will be found necessary to stop occasionally, to pick up or loosen the plaster, which becomes compacted by its motion. The elevated position of the sower enables him to make a very broad cast, and if advantage is taken of the wind, he will be able to avoid the respiration of any great quantities of dust."

Marl consists of calcareous matter, clay, and sand, or some two of these earths, (of which lime or chalk is always one,) in various proportions. The blue clay marl is free from sand. Clay marl is also sometimes of a yellowish white, yellowish gray, or a brown or red cast. The shell marl seldom contains clay. In schistus or stone marl, sometimes sand and sometimes clay preponderates, generally the former. The sand marl, whether shell or schistus, should be applied to clays; and clay marls to sands. In both cases they correct the defects of the soil, by rendering it, in the first, less adhesive; and, in the latter, less open and porous.

The earths are not the food of plants. They constitute the stomach, analogous to the stomach of animals, in which vegetable and animal matter is received, digested, and with the aid of the leaves [lungs] assimilated to vegetable chyle and blood. The best soil for this digestive process, is that in which the three above-named earths are suitably blended.

A sandy or gravelly soil is called hungry, because it digests rapidly, and dissipates the food committed to its bosom. Hence green crops, or frequent manurings, are necessary to continue it healthy and productive. Such soils are defective in clay and calcareous matter. Their texture may therefore be improved, and their fertility increased, by the application of clay marl; or, what is the same, by clay and lime separately; though these materials are found most pure and best blended in the substance of marl. The quantity should be proportioned to the natural deficiency of these materials in the soil. From eight to one hundred loads per acre have been applied in one or two dressings; and their beneficial effects have been known to continue thirty years. All the sand soils of Norfolk, England, have been marled [clayed]. Calcareous matter, combined with sulphuric acid [oil of vitriol], is usefully applied to soils in the form of gypsum, or plaster of Paris; as is also powdered limestone and chalk, both calcareous. I am induced to believe that neither wheat nor sainfoin grass will thrive in a soil destitute of calcareous matter, which is the condition with most of our sands.

A stiff, moist clay, is called *cold*, and is unfriendly to the finer grasses as well as grains. Its texture is too compact to permit the roots to extend freely, and its temperature too cold to carry on the digestive process sufficiently rapid for the plants which grow upon its surface. Sand and lime, or siliceous marl, loosen its texture, render it permeable to heat, &c., and powerfully assist to concoct the food of vegetables.

Marl may be known by the most ordinary observer. The application of a mineral acid, and even of good vinegar, will cause an effervescence. This is the operation of the acid upon the lime. Its siliceous and argillaceous properties may be ascertained by the sight and feeling, by the aid of water, or of glass. Sand subsides or settles quicker than clay in a liquid; and will scratch glass, which clay will not.

It is a remarkable fact in the economy of nature, that the indigenous plants of every country are precisely those which are best adapted to furnish the proper sustenance to its animal population, and to satisfy its medicinal wants. So in regard to our soils; every district generally affords the means of producing fertility. Hence the clay marls generally underlay sands; and shell and sand marls most abound in the neighbourhood of clays. And in addition to the variety of fossil substances which are calculated to increase fertility, every thing that grows upon the earth, every particle of animal and vegetable matter, is reduced to air and water by the chemical operations of nature, and in these forms become the food of new plants, to nourish animals. It is a truth calculated to teach humility, that the animal, the vegetable, and the putrid mass of dung, are found on chemical analysis to be very nearly alike, and that, in the natural order of things, they constantly nourish, feed, and produce each other. "Nothing is nourishment for a vegetable but what enters into the permanent composition of a vegetable. Nothing is nourishment for an animal but what was originally a vegetable." Man is enjoined to earn his bread by the sweat of his brow. He finds the most noble incitements to duty scattered around him, and he is seldom disappointed in obtaining the rewards, competence, and health, which industry promises to her votaries. But I have another remark to make as to the food of vegetables. How scrupulously careful is the farmer of his grain, hay, and roots, which are destined to nourish and fatten his animals; and yet how thoughtless and inattentive as to the food of his plants! Vegetable and animal substances are suffered to waste in his fields and yards, unmindful of the havoc which the rains, winds, and sand, are daily making upon them; while a moiety of his fertilizing materials, the urine of his stock, is altogether lost. He will not suffer the flocks of his neighbours to rob his own of their food; yet he sees, with but feeble efforts to prevent it, his plants plundered by pestiferous weeds of the food which is essential to their health and vigor.

"To find the composition of a marl, pour a few ounces of diluted muriatic acid into a Florence flask; place them in a scale, and let them be balanced: then reduce a few ounces of dry marl into powder; and let this powder be carefully and gradually thrown into the flask, until, after repeated additions, no farther effervescence is perceived. Let the remainder of the powdered marl be weighed, by which the quantity projected will be known. Let the balance be then restored. The difference of weight between the quantity projected and that requisite to restore the balance, will show the weight of air lost during effervescence. [That air proceeds from the calcareous earth alone, which contains forty-four per cent. of this carbonic acid air. Suppose five hundred grains of marl lose forty-four grains by the escape of air, then that marl contained one hundred grains, or one-fifth of its whole weight, of limestone. — T. C.] If the loss amount to twenty or twenty-five per cent. of the quantity of marl projected, the marl assayed is calcareous marl, or marl rich in calcareous earth. Clayey marls, or those in which the argillaceous ingredient prevails, lose only eight or ten per cent. of their weight by this treatment, and sandy marls about the same proportion. The presence of much argillaceous earth may be judged by drying the marl, after being washed with spirit of salt, when it will harden and form a brick.

"To determine with still greater precision the quantity of calcareous earth in marl, let the solution in muriatic acid be filtered and mixed with a solution of carbonate of potash, till no farther precipitation appear. Let the sediment subside; wash it well with water; lay it on a filter, previously weighed, and dry it. The weight of the dry mass will show how much carbonate of lime the quantity of marl submitted to experiment contained. See *Kirwan on Manures.*

"The quantity necessary to be used, varies according to the nature of the soil; but the utmost caution is requisite, because if too large a portion be scattered on the land, it cannot be easily removed, and if too little be employed, the deficiency may be readily supplied. On sandy, gravelly, or light soils, it will be advisable to spread as much as will form a thick coat, in order to bind and stiffen the ground But, of whatever nature the land may be, the most judicious cultivators recommend such a portion to be laid on it, as will form a thin coat over the whole surface.

"The proper season for *marling* is the summer; as this kind of manure is then perfectly dry, and not only lighter, but also more easily reduced to a powder. Marl, however, may be advantageously spread during the winter frosts; as in the latter season, there are few opportunities of performing other labors of the field.

"Previously to marling, the land ought to be diligently cleared from all weeds, and rendered level, both with the brake and the common harrow, so that the marl may be equally spread on the surface, where it should be suffered to lie during the winter. In the month of February, [March, or April,] and in dry weather, it will be proper to draw a bush-harrow, well weighted, over the land, that the marl may be uniformly distributed; but, as this manure is very ponderous, and sinks to the bottom of the furrow, if injudiciously ploughed in, it has been suggested to turn it into an *ebb-furrow* for the first crop: during the growth of the latter, the marl will incorporate with and become a part of the soil, from which it does not readily separate. So permanent, indeed, are its fertilizing properties, that if land be properly marled, it will continue arable for the space of twelve or fourteen years; and, for pasture, during a much longer period.

"A good *artificial marl* may be prepared by mixing equal quantities of pure clay and lime, in alternate layers, so as to form a heap, which should be exposed to the winter frost: this compound is well calculated for light lands; but if the soil be strong and heavy, it will be necessary to substitute loam and sand for the clay. Such compositions may be usefully employed where marl is not easily procured; as they will amply repay the labor bestowed on mixing them, being little inferior to the genuine calcareous earth." — *Domestic Encyclopedia.*

An English writer on agriculture observes, that "whoever finds marl finds a mine of great value. It is one of the best and most general manures in nature; proper for all soils, and particularly so for clay." It is usually found under moss or peat, in low sunken lands, and especially nigh the sea or large rivers. It has been sometimes discovered by ant-hills, as those insects bring up small pieces of shells from their holes.

Peat is a well-known substance, used both for manure and for fuel. In its natural state peat is of but little or no service as manure, but by exposing it to the effects of fermentation it becomes very useful as food for plants. In its unfermented state it contains a considerable quantity of tannin, which is a powerful astringent, resisting all approaches to putrefaction; and is impregnated with acids injurious to vegetation, which can be expelled by fermentation with barnyard manure, and other suitable substances.

The following method of preparing peat for manure is extracted from a small treatise by lord Meadowbanks, which was printed and distributed gratis among the Scottish peasantry, and has been highly approved of both by practical and scientific cultivators.

"Let the peat-moss, of which compost is to be formed, be thrown out of the pit for some weeks or months, in order to lose its redundant moisture. By this means it is rendered the lighter to carry, and less compact and weighty, when made up with fresh dung for fermentation; and accordingly, less dung is required for the purpose, than if the preparation is made with peat taken recently from the pit. The peat taken from near the surface, or at a considerable depth, answers equally well. And the more compact the peat, and the fitter to prove good fuel, so much the more promising it is to be prepared for manure.

"Take the peat-moss to a dry spot, convenient for constructing a dunghill, to serve the field to be manured. Lay the cart-loads of it in two rows, and of the dung in a row betwixt them. The dung thus lies on the area of the compost dunghill, and the rows of peat should be near enough each other, that workmen in making up the compost may be able to throw them together by the spade. In making up, let the workmen begin at one end; and at the extremity of the row of dung, (which should not extend quite so far at that end as the rows of peat on each side of it do,) let them lay a bottom of peat, six inches deep, and fifteen feet wide. Then throw forward, and lay about ten inches of dung above the bottom of peat; then four or five of dung; and then cover it over with peat at the end where it was begun, at the two sides, and above. The compost should not be raised above four feet and a half high, otherwise it is apt to press too heavily on the under parts, and check the fermentation: unless the peat, when dry, be very puffy and light, and then a much greater height is desirable. Neither should it be much lower, otherwise it will prove wanting in the compactness, and soon also, if the weather is very dry, in the moisture required for the ingredients of which it consists, to act chemically on each other. When a beginning is thus made, the workmen will proceed working backwards, and adding to the column of compost as they are furnished with the three rows of materials directed to be laid down for them. They must take care not to tread on the compost, or render it too compact; and of consequence, in proportion as the peat is wet, it should be made up in lumps, and not much mashed or broken.

"In mild weather, seven cart-loads of common farm-yard dung, tolerably fresh made, is sufficient for twenty-one cart-loads of peat-moss; but in cold weather, a larger proportion of dung is desirable; at least, it is prudent to omit putting any peat between the two upper layers of dung, and rather thicken the outer coating with peat. It is also proper in winter, if ground with a dry bottom can be conveniently employed for the purpose, to increase greatly the breadth of the dunghill, which, in that case, may be done without any limit, by adding, all round the dunghill, circles, consisting of layers of dung and peat, of seven feet in breadth. And if the mass of the dunghill is thus enlarged, there is little occasion to exceed the proportion of dung recommended for making up to prepare in the milder season; especially if a covering of coarse vegetables of any sort, such as waste hay or straw, rushes, broom, or furze, or brushwood of evergreens, is thrown over the dunghill. In fact, a covering of this sort is scarce less useful in summer to prevent the escape of moisture, than in winter to exclude cold.

"To every twenty-eight cart-loads of the compost, when made up, it is of use to throw on above it a cart-load of ashes, either made from coal, peat, or wood; or if these cannot be had, half the quantity of slacked lime may be used, the more finely powdered the better. But these additions are in nowise essential to the general success of the compost, provided a sufficiency of time is allowed to the preparation to compensate for the want of them.

"The dung to be used should either have been recently made, or kept fresh by compression; as by the treading of cattle or swine, or by carts passing over it. And if there is little or no litter in it, a smaller quantity will serve, provided any spongy vegetable matter is added at making up the compost, as fresh weeds, the rubbish of a stack-yard, potato-shaws, sawings of timber, &c. And as some sorts of dung, even when fresh, are much more advanced in decomposition than others, it is material to attend to this; for a much less proportion of such dung, especially if abounding in animal matter, as is less advanced, will serve for the compost, provided care is taken to keep the mass sufficiently open, either by a mixture of the above-mentioned substances, or, if these are wanting, by adding the peat piecemeal, that is, first mixing it up in the usual proportion of three to one of dung, and then, after a time, adding an equal quantity, more or less, of peat. The dung of this character of greatest quantity is shamble-dung, with which, under the above precautions, six times the quantity of peat, or more, may be prepared. The same holds as to pigeon-dung and other fowl-dung; and to a certain extent, also, as to that which is collected from towns, and made by animals that feed on grains, refuse of distilleries, &c.

"The compost, after it is made up, gets into a general heat, sooner or later, according to the weather and the condition of the dung; in summer, in ten days or sooner; in winter, not perhaps for many weeks, if the cold is severe. It always, however, has been found to come on at last; and in summer, it sometimes rises so high as to be mischievous, by consuming the materials, (fire-fanging.) In that season a stick should be kept in it in different parts, to pull out and feel now and then; for if it approaches to blood-heat, it should either be watered or turned over; and on such an occasion, advantage may be taken to mix with it a little fresh peat. The heat subsides, after a time, and with great variety, according to the weather, the dung, and the perfection of the making up of the compost; which then may be allowed to remain untouched, until within three or four weeks of using, when it should be turned over, upside down, and outside in, and all lumps broken: then it comes into a second heat, but soon cools, and is fit to be taken out for use. In this state the whole, except bits of the old decayed wood, appears a black free mass, and spreads like garden-mould. Use it, weight for weight, as farm-yard dung; and it will be found, in a course of cropping, fully to stand the comparison."

Many other articles are useful for manure, such as blood, offals of animals, hair, refuse feathers, woollen rags, hoofs and horns of cattle, sheep, &c.; bones of all kinds, pounded, broken, or ground, at the rate of sixty bushels to the acre; raw skins; fish of all kinds; swamp mud, river mud, pond mud and sea mud, wood ashes, turfs, sea-weeds, moss mixed with dung in holes,—good for potatoes,—turf from highways, &c.; shells of shell-fish; scrapings of streets and back yards; rubbish of old houses, and earth which has long been under cover. Both of these collect and retain nitre. Old brine of salted meat or fish, which contains, besides salt, some blood, oil, &c., in composts. Sea water, which contains other substances besides water and salt, which are fit for nourishing plants. Soap-suds, replete with a prepared food for plants; excellent for watering gardens in dry weather. None of this should ever be lost. If the garden be distant or wet, it may enrich the dung heap. Water in the hollows of farm-yards. Instead of suffering this liquor to soak into the earth, it should be taken up by straw litter, or some absorbent substance thrown into it, or carried out in a water-cart, and sprinkled over land which needs it, in the manner in which streets are watered in cities.

In the "New England Farmer," (Vol. IX. p. 245,) was published an article written by Hon. John Lowell, from which the following is extracted:

'A few years since, the Hon William Ellis, of Dedham, recommended to me the use of the head and feet bones of oxen, as a highly valuable manure on meadow lands. He said he had observed, in passing, that I had grounds remarkably well adapted for this manure. I, however, neglected this hint, though I constantly kept it in mind, until the last year, when, seeing an immense load of the heads of oxen passing by, I inquired of the owner for what purpose he was carting these materials, and he answered me to the following facts, viz. : that he came down a distance of eight miles with an empty team, and was carrying back a load, which cost him two dollars, to put on his meadow land. I found it was no new experiment with him, and that he came often for that purpose.

"I made the experiment. Its success surpassed all his descriptions. The manure brought in new grasses. It encouraged and invigorated the old.

"I am aware it is only of limited application, but it is no trifling thing to render useful an article formerly thrown away. We know so little of the philosophy of manure, that I shall not speak positively on the subject. All I shall say is, that there is much animal matter still adhering to the bones, and animal matter has been found by experience to promote the growth of vegetables.

"The mode of application is, to break them up with a sledge, or with the back of an axe, and then to press them below the surface by a rammer or beetle. The only point to which I offer my testimony is, that *the effects are much greater* than an *equal quantity* of horse and cow dung. This may be relied on."

FENCES. The kinds of fence and manner of fencing, should vary, according to the difference of soils and the kinds of materials for fencing In new lands logs are and ought to be most used. When built of white pine, they will last about twenty years. Other sorts of wood, such as pitch-pine, hemlock, ash, oak, &c., will endure for a considerable time if not placed too near the ground. If a fence be made partly of white pine and partly of other wood, the former should be laid nearest to the ground. If logs are peeled they will last the longer in fences.

It has been practised by some farmers to make posts for fences very durable by the following simple process. They bore a hole in that part of the post which, when set, will be just at the surface of the earth, with such a slope as will carry it downward an inch or two. They then fill the hole with salt, which will preserve the timber a long time from decay.

In many parts of the country posts and rails will be found the cheapest materials for fence. In making fences of this description, it is advised by Mr. Preston, of Stockport, Pennsylvania, to set the posts with the top parts in the ground; and he asserts that they will, in that position, last three or four times as long as when they are set with the butt ends down. He advises, also, in making fences, always to place the rails with the heart side up.

The best timber for rails, according to Dr. Deane, is red cedar. It is easy to split, light to carry and handle, sufficiently strong, and the most durable of any. In the Transactions of the Society of Arts, in England, there is an account which states, in substance, that posts of oak, and others of chestnut, were set down in Somersetshire, where they had to undergo repairs in eighteen years. The oak posts were then found to be unserviceable, and the chestnut very little worn. The oak posts were renewed, the chesnut remained, and in twenty-five years afterwards they were not so much rotted as the oak.

If the lower ends of posts are scorched in a hot flame before they are put into the ground, they will last the longer. Some recommend soaking them in sea-water to keep them from rotting. The posts should be set at least two feet in the ground. Some farmers cut their posts so long, and mortise them in such a manner, that they can turn them upside down, when the lower ends become rotten.

It is said in the Barnstable Journal, that "Deacon Winslow Martin has on his farm a kind of fence, which for durability and beauty can hardly be exceeded. On each side of the road adjacent his dwelling, are rows of large buttonwood trees, set ten or twelve feet asunder. Into these, when young, cedar rails were inserted, as into common posts. As the trees increased in size, the wood formed closely around the ends of the rails, and firmly secured them in their places. It is certainly a durable and cheap fence, because it will require no repairs at least for one generation, and is moreover constantly increasing in value. Were our roads lined with this kind of fence, it would add not a little to the beauty of the country and the comfort of the traveller."

The 'Farmer's Guide" observes, that "post and rail fences and board fences are very good where the soil is dry. In a wet soil, the posts will be moved by frost. Red cedar, locust, and chestnut, are best. Butternut, black walnut, and oak, are pretty good, lasting about fifteen years. For the rails, cedar is best, lasting perhaps an age. If timber is scarce, and the ground is level and free from stones, post and rail fences, set in a bank of the earth of two small ditches, thrown up together, ought to be preferred. If the posts are too small to have holes made through them, the rails may be flattened at the ends, and fastened to the posts with spikes, or with wooden pins well secured."

When ground is wholly subdued, and the stumps of its original trees quite rotted out, stone walls, properly made, are the best and cheapest fences. On hard, sandy, or gravelly soil, a wall will stand many years without repairing. On a clay or miry soil, the foundation should be laid in a trench, nearly as low as the earth freezes. But a wall of flat or square shaped stones will stand pretty well on any soil on the surface.

A writer for the "Genesee Farmer" gives the following directions for "Planting Posts for Garden Fences, &c."

"Instead of filling the holes up with the earth taken out in digging them, I would recommend filling in around the posts leached ashes instead of common earth, and topping off with five or six inches of unleached ashes above the surface of the ground; for it is generally between *wind and water*, as the sailors term it, that garden posts begin to decay. My reason for recommending ashes is, that I have frequently found pieces of board, hoops, and staves, buried under heaps of leached ashes, which had lain there many years, and were quite as sound as when first buried. No doubt many of your readers have noticed the same, in removing old ash-heaps near potash works."

HEDGES. In some soils, situations, and circumstances, hedge fences will be found most advisable and economical. The following remarks on this subject, by the Hon. John Lowell, were published in the "New England Farmer,' Vol. X. p. 339.

"It is not my intention to recommend live hedges for this rocky part of the United States. Our own stones furnish he best divisions we could ask for or desire; and on most farms the removal of them from the soil would be economical, and the placing them as partitions for fields is the cheapest and most natural mode of disposing of them. Still, in New England, there are extensive tracts of country of alluvial or diluvial soil, in which no rocks are found, and in which a stone wall could not be obtained without great expense. Such is the state of the greater part of the old colony below Plymouth, and of some parts of the county of Middlesex. But wherever wood fences are required it may be useful to substitute live hedges.

"The Virginia thorn, is in most cases utterly useless as a fence. This is chiefly owing to the ravages of a worm at its root; whether it be the same which attacks the apple and the quince, is a point not settled. The same objection is applicable to the English hawthorn. And to this *fatal* one is superadded another, the appearance of a fungus of a yellow color on the leaves, which utterly disfigures them and strips them of their foliage in September. The *gleditschia triacanthos* is not suited for hedges with us. If left to grow they soon grow out of all reach, if checked they are winter-killed. We are indebted wholly and entirely to the experiments of Ezekiel Hersy Derby, Esq. for the possession of a plant, the buckthorn, (*rhamnus catharticus*,) which, from ten years' trial, seems to afford every desirable quality for a healthy, beautiful, and effectual hedge.

"I have tried this plant for six years. It is hardy and rapid in its growth, of impenetrable thickness, and so far as that extent of experiment enables me to judge, not subject to any disease, or the visitation of any insect whatever. As it is very provoking as well as expensive to cultivators to be led astray, and to find after five or ten years that they have been deceived, they would do well to examine growing hedges of the buckthorn."

The following is extracted from a notice of Mr. Derby of the cultivation and uses of the buckthorn. The tree from which my plants were raised, formerly stood in the garden of the venerable Dr. Holyoke, who used the berries for medicinal purposes, and was as large as any of our common apple-trees. He was induced at last to cut it down, as it shaded so much of his garden. I was so pleased with the healthy and clean appearance of the tree, and the next spring observing several young plants, raised from seed dropped in the autumn, that I was induced to transplant them to a nursery, where they grew with great rapidity.

"After trying several kinds of trees for the purpose of making a hedge, without much success, I was induced to try this, which has afforded a most beautiful fence, so much so as to attract the attention of every person who has seen it. It divides my garden, is about three hundred feet in length, the plants set nearly a foot apart, is five feet high, and two feet wide at top, which is cut nearly level. It shoots early in the spring, makes a handsome appearance, and continues its verdure till very late in the fall. It has not so much spine as either the English or American hawthorn, but I think sufficient to protect it from cattle. The plant bears the knife or shears remarkably, and makes as close and tight a fence as either of the others, and is not subject to blight, as both of them have been with me. The tree furnishes a large quantity of seed, which rapidly vegetates; and I make no doubt it can be propagated by cuttings."

We are apprehensive that no species of thorn can be cultivated to advantage in New England for the purpose of making hedges, on account principally of the insects which in this part of the country infest that plant. Some, however, prefer the American thorn, (*cratægus cordata.*) A valuable communication relative to the use of this and other plants for live fences, by B. S., M. D., may be found in the "New England Farmer," Vol. IX. p. 209.

Upon consulting Mr. Lowell, as to any changes it would be proper to make on the article of hedges, he states, that he still gives the preference to the buckthorn, but that the Newcastle thorn, grown by John Prince, Esq., is more beautiful, and it bids fair to be as enduring and as free from disease. The rapidity of growth of the buckthorn is, in his judgment, a full equivalent for the beauty of the other.

SHEEP. There are a great many varieties of sheep, with differences more or less marked. To give even an abridged account of all the kinds described in foreign publications, would require a large volume. In England, the principal division of sheep is into the LONG WOOL and the SHORT WOOL kinds. Among those bearing long wool, are the *Leicester*, *Devonshire Nots*, *Exmoor*, *Heath*, the *Bakewell* or *Dishley* breeds, &c. &c. The origin of the last-mentioned breed of sheep is thus described by an English writer:

"Mr. Bakewell selected from his own flock, and from the flocks of others, those sheep to breed from, which possessed in the greatest degree that perfection of form he was desirous to retain and perpetuate. By judiciously crossing them, and selecting the most perfect of their progeny, he at length succeeded in forming the breed, which has been distinguished by the name of the New Leicester, or Dishley breed; and having attained his object, he carefully guarded against any future intermixtures with other breeds. This breed exceeds all others in its propensity to fatten; and by crossing by rams with this breed, a considerable portion of the long-wooled sheep in England have been greatly improved in this respect.

"The Dishley breed are distinguished from other long-wooled breeds by their fine lively eyes, clean heads, straight, broad, flat backs, round (barrel-like) bodies, very fine small bones, thin pelts, and inclination to fat at an early age. The last property is probably owing to the before-specified qualities, which, from observation and experience, there is reason to believe extend generally through every species of domestic quadrupeds. The Dishley breed is not only peculiar for the mutton being fat, but also for the fineness of the grain; the flavor is superior to the mutton of most other long-wooled breeds. The weight of the carcass may be stated in general: ewes three or four years old, from eighteen to twenty-six pounds per quarter; wethers two years old, from twenty to thirty pounds."

Among the *short-wooled* sheep, the English possess, besides the Merino breed, *South Downs*, the *Ryeland*, the *Shropshire*, the *Shetland*, the *Dorset*, *Wilts*, &c. &c. Merino sheep were first introduced into Great Britain in the year 1787; and although it was formerly a general opinion, that the excellence of their fleece depended in a great degree upon the temperature of the Spanish climate, it has been ascertained that the fineness of the Spanish wool is not impaired by breeding the sheep in England, France, Saxony, Hungary, &c.

It is important in the management of sheep to keep the store sheep in as equal condition as possible, but not too fat, all the year round. In the grass season they should be kept in dry pastures, in which the grass is short and sweet. During the winter they should have a steady and measured allowance of suitable food, and not sometimes be fed profusely, and at other times scantily.

Mortimer says, "The farmer should always buy his sheep from a worse land than his own, and they should be big boned, and have a long greasy wool. For the choice of sheep to breed, the ram must be young, and his skin of the same color with his wool; for the lambs will be of the same color with his skin. Those ewes which have no horns are found to be the best breeders."

The farmers of Europe know how to distinguish the age of sheep by their teeth. When a sheep is one shear, as they express it, that is, has been sheared but once, or is in its second year, it has two broad teeth before; when it is two shear, it will have four; when three, six; when four shear, or in its fifth year, it will have eight teeth before. After this, their mouths begin to break.

"The fat pastures breed straight, tall sheep, and the barren hills square and short ones. But the best sheep of all, are those bred upon new ploughed land, the reason of which may be easily guessed, as such land is commonly the most free from bad grasses. All wet and moist lands are bad for sheep, especially such are subject to be overflowed, and to have sand and dirt left on them. The salt marshes are an exception from this general rule; for their saltness makes amends for their moisture; any thing salt, by reason of its drying qualities, being of great advantage to sheep. The best time for sheep to yean, which go twenty weeks with lamb, is in April, unless the owner has any forward grass, or turnips. Ewes that are big should be kept but bare; for it is dangerous for them to be fat at the time of their bringing forth their young. They may be well fed, indeed, like cows, a fortnight beforehand, to put them in heart."

M. Buffon says, "One ram will be sufficient for twenty-five or thirty ewes; but that he should be remarkable for strength and comeliness; that those which have no horns are very indifferent; that the head of a ram should be large and thick, the forehead broad, the eyes large and black, the nose short, the neck thick, the body long, the back and rump broad, the testicles large, and the tail long; that the best are white, with a large quantity of wool on the belly, tail, head and ears, down to the eyes; that the best sheep for propagation are those which have most wool, and that close, long, silky and white; especially if at the same time they have a large body, a thick neck, and are light-footed"

He says, "That ewes fatten very fast during their pregnancy; that as they often hurt themselves, and frequently miscarry, so they sometimes become barren; and that it is not very extraordinary for them to bring forth monstrous productions. But when properly tended, they are capable of yeaning during the whole of their life, or to the age of ten or twelve years. But most commonly when they come to be seven or eight year old, they begin to break, and become sickly; and that a ram is no longer fit for propagation after eight years, at which time he should be fattened with the old sheep."

According to the same writer, "Sheep should in the summer be turned out early in the morning to feed; and in four or five hours, after watering, be brought back to the fold, or to some shady place. At four o'clock, in the afternoon, they should be turned to their pasture again, and continue there till evening; and were it not for the danger of wolves, they should pass the night in the open air, which would render them more vigorous, clean, and healthy. As the too great heat of the sun is hurtful to them, shady pastures are best for them; or else to drive them to a place with a western descent in the morning, and the contrary towards evening." That their wool may be saved, they should not be pastured in bushy places, or where there are briars. Sheep are often thus deprived of most of their fleeces; which, besides the loss of the wool, is very hurtful to the animals, when the weather is not warm.

The above writer directs, "That every year a flock of sheep should be examined, in order to find out such as begin to grow old, and ought to be turned off for fattening. As they require a particular management, so they should be put in a flock by themselves. They should feed while the grass is moistened with dew in the morning. Salt should be given them to excite thirst, as the more they drink the faster they will grow fat.* But to complete their fattening, and make their flesh firm and solid, they should have some corn or grain given them." They may be fattened in the winter; but it is commonly too expensive, as they will require a good deal of richer food than hay. When sheep are once become fat, they should be killed; for it is said they cannot be made fat a second time. The teeth of ewes begin to decay at five, those of wethers at seven, and those of rams not until eight.

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* It has been found, however, that salt given in excess is injurious to sheep.

Ewes, Lambs, &c. It is recommended to give ewes with lamb a somewhat more than ordinary quantity of food for a month or six weeks before they are expected to yean; not enough, however, to make them fat, as dangerous consequences might attend their being in very high condition at that period. Turnips are said to be injurious to ewes with lamb, but may be well given them after they have yeaned. If your sheep, whether store sheep or ewes with lamb, have good hay, about a quart of potatoes a day to each will, it is said, be very beneficial, and an ample allowance. But when the object is to fat them, according to a writer in Rees' Cyclopedia, about a gallon of potatoes a day, with a little hay, will be the proper quantity; but this is dependent, in part, on the size of the animals, and in part on the quality and quantity of the hay which is allowed to them. Potatoes, besides their use as *food* for sheep, are said to be very serviceable as an article of diet, which usually supersedes the necessity of *medicine*. They have, when given raw, an opening or purgative quality, which is thought to be of use, and answer a similar purpose with sheep which is effected with swine by brimstone and antimony. Potatoes, baked, steamed, or boiled, will furnish more nutriment than those which are raw.

Care should be taken to place in the stable small tubs or troughs of water for the sheep to drink in. They will do very well in summer without water, as they feed when the dew is on, but they need water in winter, especially if fed mostly on dry food. "When sheep have colds, and discharge mucus from the nose, good feeding, together with pine boughs, given occasionally, will cure them; or tar, spread over a board, over which a little fine salt is strewed, will induce the sheep to lick up tar, and this will cure a cold."* Half a gill of Indian corn a day, given to each sheep during winter, is recommended as keeping them in good heart, preventing the wool from falling off, and enabling the ewes to rear their young better than they would if fed altogether on food of a less substantial nature.

"When several kinds of food can be procured, it is right to give them alternately to the sheep at different meals, in the course of the same day; the qualities of one kind aid or compensate those of another. At certain hours of the day, dry fodder should be given, and, at others, roots or grain. If there be any danger that the roots may decay, the winter should be begun with them, mixing, however, some dry food with them, for alone they would not be sufficiently nutritious."*

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* Deane's New England Farmer.

Writers do not agree on the quantity of food which a given number of sheep will consume to advantage in a given time. Probably, it would be very difficult to lay down any rules on the subject which would not be subject to very nearly as many exceptions as coincidences. Some seasons would require more food than others for the same sheep; the same number of sheep of different sizes, ages, sexes, and breeds, would also consume different quantities of food of the same quality. When we add to these causes of error the consideration that food of the same kind is often very different in quality, — one ton of clover hay, for example, mowed at the right period of its growth, and well made and housed, may be worth two tons of the same sort of hay grown and made under different circumstances, — nothing, therefore, can be hoped for in this inquiry, except some approximation to truth. We may, however, perhaps provide ourselves with materials for the exercise of those qualities for *guessing*, for which New England people are celebrated. When a man is laying in fodder for his sheep or neat cattle, it may be of great consequence to be able to form a conjecture approximating the truth, relative to the quantity and quality of provisions for that purpose which it may be expedient to accumulate.

Mr. Lawrence says, "Sheep will eat, on an average, twenty pounds of turnips each in twenty-four hours. An acre of good turnips in the field, between November and March, will keep one hundred sheep six weeks. One gallon of raw potatoes will suffice a sheep twenty-four hours, but some will eat much more. Fourteen hundred sheep will eat up and spoil an acre of good turnips in a night. Of the quantities of hay and corn [grain] which a sheep will consume daily, I do not recollect any accurate experiments. To feed liberally one hundred sheep with this precious article throughout the winter season, ten tons at least would be required; although I have lately been informed by a great sheep-master, that he allows but that quantity to a flock of one thousand; his turnips being excellent, with plenty of grazing ground.

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* Tessier's Treatise on Sheep.

"As to corn [grain], a large sheep will eat several pints or pounds per day; and the comparison of quantity of food between the sheep and the ox may be generally stated at one-eighth or one-ninth part for the sheep."

"One thing (says M. Tessier) cannot be too much recommended, which is, to place the hay in the racks while the sheep are out of the house; by this precaution, the dust will not fall upon the fleeces." Dr. Deane observed, that the rack in which the hay is put should be upright, so that in feeding, the seeds, chaff, &c. should not fall into the wool about their necks. Under the rack should be a trough for catching the seeds of the hay and feeding the sheep.

With regard to giving salt to sheep, writers have disagreed. It is believed to be better not to give them any than to allow them too great a quantity. M. Tessier says, "Sheep have been known to be attacked by long and troublesome looseness, in consequence of having taken too much salt; which has induced the belief that sea-water is poisonous to them; and that his sheep have always been healthy, though he had never given them any salt. But he states that it may be indispensably necessary in wet countries. And Dr. Cooper, editor of the last edition of the Domestic Encyclopedia, recommends one-fourth of an ounce a day as a proper quantity for sheep. Mr. Grove likewise says, "Salt is required by sheep at intervals during the whole year, but it is often given in too great quantity, and almost forced upon the sheep; which is often injurious, and often injures the digestion so that the best grain will pass through them unaltered."

The same writer says, "In the season for dropping lambs, the utmost care is necessary. The birth is most commonly easy, but often slow. Ignorant shepherds are very apt on such occasions to be aiding in the birth, which is always useless and often very injurious."

"It often happens," says Mr. Grove, "that ewes will not own their lambs, particularly the first they bear; and in this case I would advise to the sprinkling a little salt on the lamb, which induces the ewe to lick it, after which she will generally allow it to suck. If not, the ewe with her lamb should be placed in a separate inclosure (of which several should be previously prepared) and fed with the most nutritious fodder, particularly with nourishing liquids, that the udder may be uncomfortably distended; and if this be not sufficient, she must be tied by the legs till the lamb has been once suckled; after which there will be no further difficulty."

Sir John Sinclair observed, that "there is no food of which sheep are fonder than pea-straw; and where circumstances are favorable for that crop, peas ought to be cultivated more for the straw, from the advantages that would thence be derived by the sheep-farmer." Mr. Young also observes, that "the straw of early white peas, applied to sheep, is the most valuable return made by straw."

A writer for "The New England Farmer," (Vol. IV. p. 234,) with the signature M. R. C., gives the following judicious remarks on sheep.

"Perhaps there is no domestic animal that requires more nice and constant attention than the sheep, and no other that will more richly pay for generous keeping. Though he may not be more liable to disease, nor require a better quality of food than neat stock, still that management which will keep cattle in good case will not answer for sheep. His habits and mode of feeding are entirely different. For instance, in the winter season a cow may be kept tied to the stall twenty-two hours out of the twenty-four, and, if well fed three times a day, keep her flesh and get sufficient exercise for her health. Serve a sheep in the same manner and it would not probably live a month. It is natural for sheep to move about and change situation. Turn a flock of hungry sheep into a pasture, they will run to the end of it before they begin to eat; feed them in troughs, they will run over all till they come to the last, when they have it in their power. They are almost continually shifting situation from hill to dale, from one kind of food to another; and it is a fact that sheep will thrive better on two or three different kinds of ordinary fodder, than they will to be confined to one kind that is of a superior quality.

"The proper time to yard sheep in the fall is while they are yet in good order from fresh feed, and before the frost takes the nourishing qualities from the grass: but a time in which many sheep are not folded, they are left to nibble over the frozen pastures till they lose the flesh of half a summer's keeping, and which takes half a winter to regain. It is a great error which is persisted in with an idea to save fodder. But setting aside the injury done pastures by close feeding at this season of the year, the sheep which stray away and are lost, and the time spent in hunting them, which are not idle considerations, the farmer would more than get repaid for his extra fodder, and a few weeks' attention in yarding his sheep sooner, by preserving their health and condition. When they are put to winter-quarters, they require as much variety as possible, not that they want so much room, but they need a number of different apartments Two yards and one shed will do very well for one flock, or, what will answer the same purpose, if a large number of sheep are to be kept near each other, have the yards in a row, and one more yard than flocks of sheep. Then by shifting one flock to the spare yard it leaves another vacant, and so on. Thus may all be changed, which should be done at every time of feeding. As fast as the yards are empty, the food should be put in them, and never while the sheep are there. One hundred sheep are enough to be kept together. Cleanliness is of the utmost importance. Their yards should be littered with straw or something of the kind constantly, or they will be in danger of losing in a degree a relish for their food.

"The next thing necessary is, to have proper places for your sheep to eat hay in, which are the common board mangers, and may make partings to the yards. Take six joists, say three inches square, and four feet long; have the boards of a length, then nail two of them to the joists set up perpendicularly in such a manner that one joist will be in the middle of each board, and the other two at the ends, and that the top edge of the boards will be one foot from the ground; then nail short boards on the ends two feet and a half long, the width of the manger, the next board on the sides to be placed eight inches from the lower boards, then board it tight to the top of the joists, and the manger is finished. A manger eighteen feet long, of this description, will accommodate thirty sheep. Single mangers may be made along the outside fence of the yard, which do not require to be so wide. The great superiority of these mangers over racks is, first, the facility of putting hay into them without dropping it on the ground, secondly, it obviates the danger of hay-seed falling on the wool of the sheep; and thirdly, it prevents any waste of fodder. The next thing after mangers for hay, should be a place appropriated for feeding out roots, which every farmer should raise to a certain extent. Although we cannot turn them to so good an account as the English feeders do, on account of the severity of our winters, still a proportion of them as food for our stock is of great importance. In order that the farmer may make the most of his roots, he should have a cellar fixed to receive them in the fall, without too much labor, and accessible at any time in the winter, without endangering them by frost. The cellar should be placed as near the yard as practicable, with a watering-place at hand. A good way of washing roots is, to have an oblong box that will hold two or three bushels, with the bottom perforated with auger holes, and rockers placed on the under side of the box; then by pouring in a little water and rocking them, the dirt will directly wash through the bottom of the box. They should then be cut fine with a sharp shovel, and they are fit for feeding out. Browse in the winter occasionally for sheep is very palatable, and is of considerable use in preserving their appetite, and as a change of food, but care should be taken to select the right kind. There are many kinds of hard wood, of which the bark and buds are very injurious.* The bark of the black cherry eaten by ewes with lamb is almost sure to produce abortion. Generally winter green is to be preferred to any other browse. White and yellow pine are best.

"Regularity in feeding sheep is of prime consequence in cold dry weather. It is not necessary to feed them oftener than three times a day, if discretion is used in the quantity of fodder. In warm weather, and especially if it is muddy, they should have little at a time, and be fed four or five times a day. Daubenton and others calculate that two pounds of hay are sufficient for the support of one sheep a day, (which, by the way, in our climate is not enough.) Calculations of this kind, if made with the utmost accuracy on one, or any number of sheep at one time, will not apply to the same sheep at another; because so much depends on circumstances. A sheep that will eat three pounds of hay in a cold day will not, perhaps, eat more than two in a warm day following; and still less in a damp one. Not that they require so much more food in cold weather than in warm, but that sudden changes affect their appetites and without injuring their health. Again, a sheep of proper form and inclination to fatten, will not need so much nutriment to preserve its flesh as one of the same weight of a coarse, rawboned, uneasy make. And one kind of hay may have double the substantial qualities of another. Therefore no certain rule can be given as to the quantity necessary for their support; though experiments of this kind are not without their use, for, as remarked in one of the "New England Farmers," they afford "a fine opportunity of guessing at the proper quantity necessary to keep a stock a given time."

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* The wood disease, so much complained of in France, is wholly owing to sheep's eating fresh buds.

"There exists a great diversity of opinion in regard to the proper time of year for lambs to come. A New York writer thinks that rams should not be taken from the ewes at all; that lambs should come early in the winter, which is the natural time. This I think erroneous; the natural time is the most convenient time, and the proprietor should be governed wholly by his means. There are advantages in having lambs come early, and disadvantages, and *vice versa* the same in having them come late. If a man has conveniences for guarding against cold, and plenty of succulent food for his ewes, February and March is decidedly the best time for them to come. It is true that they require more attention at this season than in warm weather, but time is not worth so much, and the lambs learn to eat hay before they are turned to pasture, consequently they do much better the following winter. They get out of the way of foxes, and are able to take care of themselves at washing and shearing time, which is of considerable consequence. On the contrary, if the farmer is deficient in proper food and other conveniences for his sheep, and has a pasture near, that he can look to his flock, it may often be advisable to have his lambs come in April or May.

"When sheep are turned to pasture in the spring, the transition from dry food to grass causes a relax, which spoils, or very much injures a great part of the wool on their buttocks and thighs, and makes double the work at the time of washing; therefore, before they are turned to pasture the wool in the way should be carefully shorn off, which is very little trouble, and makes a saving worth noticing.

"In selecting a flock of sheep, the first care undoubtedly should be, to get those of the evenest and finest wool; the next, those of the best form and most peaceable disposition; and the next care, which is very little thought of, to get those that are without horns. Any one who has had the management of sheep in the winter, can testify to the injury which large-horned sheep do in crowding after fodder and running through gates, &c. Horned rams kept with pregnant ewes do great mischief. In many parts of Spain they amputate the horns of their rams, for which there are various processes: some use a large chisel; others a saw, which is the most expeditious way, and is preferable. There are other serious objections to the keeping of horned sheep, which I cannot better exemplify than by quoting the following words from Henry Cline, an eminent surgeon.

"'Horns are useless in domestic animals. It is not difficult to breed animals without them. The breeders of horned cattle and horned sheep sustain a loss more extensive than they may conceive; for it is not the horn alone, but also much more bone in the skulls of such animals, to support their horns; besides, there is an additional quantity of ligament and bone in the neck, which is of small value. The skull of a ram with its horns weighed five times more than another skull which was hornless. Both these skulls were taken from sheep of the same age, each being four years old. The great difference in weight depended chiefly on the horns, for the lower jaws were nearly equal, one weighing seven ounces and the other six ounces and three-quarters; which proves that the natural size of the head was nearly the same in both, independent of the horns and the thickness of the bone which supports them. In a horned animal the skull is extremely thick, in a hornless animal it is much thinner, especially in that part where the horns usually grow.'

"To those who have not reflected on the subject, it may appear of little consequence whether sheep or cattle have horns; but, on a very moderate calculation, it will be found that the loss in farming stock, and also in the diminution of animal food, is very considerable from the production of horns and their appendages. A mode of breeding which would prevent the production of these, would afford a considerable profit in an increase of meat and wool and other valuable parts."

Shearing Sheep, &c. Deane's "New England Farmer" states, that "we shear our sheep in general too early in this country. In England, where the spring is more forward than in this country, the approved time of shearing is from the middle to the latter end of June. They should be washed in a warm time; after this they should run three or four days in a clean pasture, before they are shorn. It is good for them to have time to sweat a little in their wool, after washing."

Mr. Lawrence says, "June seems [in England] to be the general shearing month, and where no extraordinary precautions are taken, the business had better be delayed till towards midsummer, more especially in cold, backward springs; because in such seasons we seldom until that period have any settled fair weather. Besides, a more perfect fleece is obtained, and fuller of yolk from the perspiration of the animal.

"Washing previous to clipping the sheep is the general custom, with few exceptions, in this country; indeed it is proper with all long-wooled sheep, but not so easily practicable with the matted, greasy, and impenetrable fleeces of the Spanish and carding-wool breed, which in Spain they invariably shear dry, as has been the practice in Devonshire, with the short-wooled sheep, for centuries."

It is observed by Loudon, that "sheep-shearing, in Romney Marsh [England], commences about midsummer and finishes about the middle of July. Those who shear latest apprehend that they gain half a pound weight in every fleece, by the increased perspiration of the sheep and consequent growth of the wool. Besides, they say, in early shearing the wool has not the condition which it afterwards acquires. But then in late shearing the fleece will have the less time to grow, so as to protect the animal against the rigors of the succeeding winter; and if a year's interval is allowed between each clipping time, after your routine is established the wool will have had the same period for its growth, whether you shear early or late. Sheep with fine fleeces, which are shorn without being washed on the back of the animal, may be clipped earlier in the season than those which are exposed to suffer for half an hour or more in cold water."

Lemuel W. Briggs, Esq., of Bristol, Rhode Island, in articles published in the "New England Farmer," (Vol. III. pages 273, 287,) stated certain facts, which would seem favorable to early shearing; and in certain circumstances, and particularly with sheep which are not washed, there can be no doubt but the practice is beneficial. Mr. Briggs stated, in substance, that Mr. Rouse Potter, of Prudence island, Narraganset bay, Rhode Island, who kept nine hundred and fifty sheep, and lost but two the preceding winter, begins to shear them by the 1st of May, if the weather is favorable, and continues daily, until he completes his shearing. For the first week, he puts those sheared under cover or in close yards every night; by that time the wool will grow so as to give them a sufficient covering. By this practice of early shearing he gains much wool, which formerly, when he put his shearing off till the middle of June, the sheep would shed; and farther, when thus early sheared, the wool begins to start and grow much quicker than when shearing is deferred to the usual time. He says, that formerly, being exposed immediately after shearing to the rays of the sun, their bare backs would frequently become sore and scabby, when no wool will grow till healed, and then what does grow from these scars is thinner and coarser than the rest.

"Mr. Potter states, that he has found from actual experiment, that he not only gets more wool, which would otherwise be lost, but the *succeeding wool* will be from half an inch to an inch longer, if sheared early, than it will be if delayed to the usual time of shearing. And farther, there is not the same necessity for washing the sheep, as the wool is much cleaner, more free from sand and dirt, when taken off early, than it would be if suffered to remain on their backs until a hot sun had compelled them to seek refuge under walls and fences."

The foregoing authorities are apparently altogether contradictory, as respects the time of year in which to shear sheep. But it is to be observed, that Mr. Potter did not wash his sheep before shearing, which must make considerable difference with regard to the risk from cold; and Mr. Potter appears to have been careful to shelter his sheep after shearing, which must in a great measure obviate the disadvantages of early shearing.

Mr. Lawrence, an eminent English writer, asserts, "It has frequently appeared to me, on reflection, that it might be preferable to shear all kinds of sheep unwashed, and to wash them after shearing, when it would be much more effectual with respect to their health. Such as were affected with foulness or eruption of the skin might be washed and scrubbed in a lye of water and wood ashes, in a large tub which would contain three. It would both conduce to the health of the sheep and promote the regular growth of the wool. Wool would probably keep best in the grease, and dust might be shaken from it. Any difficulty in respect to fixing the price of wool in an unwashed state would vanish in a season or two."

"Clipping off the coarse soiled wool about the thighs and docks," says Loudon, "some weeks before the usual time of washing and clipping the sheep, is an excellent practice, as by this means the sheep are kept clean and cool when the season is hot; and with ewes, the udders are prevented from becoming sore."

In separating for the purpose of washing, the flock is brought to the side of the washing-pool, and those lambs and sheep of different kinds fit to be washed are put into separate inclosures; and such lambs as are too young to be clipped are not washed, but confined in a fold or inclosure ot any kind, at such a distance from the washing-place that they may not disturb their mothers by bleating.

In performing the operation of washing, it was formerly the method to have the washers standing up to their breast in the water; but from the inconvenience and danger of it, various other modes of performing the operation have been proposed. Among others, that of sinking an empty hogshead or other vessel of sufficient capacity for a man to stand in while washing the sheep, may be as eligible as any. A boat near a bold shore of a sheet of water, with one end aground, by which the sheep is introduced and put overboard, while the man who washes him remains in the boat, and extends his arms over the sides, and thus performs the necessary manipulations, furnishes a convenient mode of washing sheep. A small perpendicular waterfall, under which sheep are conducted, may likewise be used to advantage for that purpose.

It was uniformly the practice, immediately after shearing, to smear the bodies of sheep with some ointment, in which tar is the chief ingredient. This, however, has been condemned, as causing a waste of wool in carding and manufacturing into cloth. But if the tar is mixed with a sufficient quantity of some greasy substance, the benefit may be obtained, (which is to preserve against ticks and the scab, as well as to increase the growth of the wool,) without any bad consequence resulting. A writer in "Rees' Cyclopedia," on wool, says much in favor of a composition greatly used in Northumberland, England, and gives the following directions for making it: "From sixteen to twenty pounds of butter are placed over a gentle fire and melted; a gallon of tar is then added, and the mixture is then stirred with a stick until the tar and butter are well combined, and form a soft, tenacious ointment." Some skill is required in its application. The locks should be divided, and the ointment applied directly to the skin. It does no good to apply it to the outside of the wool, but it must come in contact with the skin. This is best effected by opening the wool along the neck and back, and applying the ointment with the finger. In short, you must apply it in such a manner that it will be most likely to spread over every part of the body. The quantity laid on each animal differs in different districts. In the lighter mode of greasing, one gallon of tar and twenty pounds of butter will be sufficient for fifty sheep. In Scotland, where greasing is applied merely to preserve the animal from inclemency of the climate, a much larger proportion of tar is used. This would be very injurious to the wool were it any other but the coarsest kind. To derive the greatest advantage from the ointment, both to the wool and the sheep, it should be applied immediately after shearing, and again on the approach of winter. By the first greasing, the wool will be kept soft and moist during the sultry heats of July and August, and the top of the staple will not become harsh and discolored. One acknowledged advantage of greasing immediately after shearing should not be overlooked: it destroys the sheep tick, and has a tendency to prevent cutaneous distempers, and to protect the skin against the bite of the fly.

Mr. J. Nelson published a recipe for the scab on sheep, similar to the above, but which we should suppose might answer a still better purpose; it is as follows: "Take three gallons of tar and three gallons of train oil, boiled together, to which add three pounds of roll brimstone, finely powdered and stirred in." This quantity is sufficient for ninety sheep. It is poured on with a pitcher or ladle from the top of the backbone to the tail.

When the object is solely the destruction of ticks, a strong decoction of tobacco is probably as good an application as can be prescribed. Lambs often suffer much from ticks, after the sheep are sheared; as the ticks which are driven from the old sheep take refuge with the lambs. It will, therefore, be advisable to apply either the ointment or the tobacco decoction to the lambs as well as to their elders. And in all cases see that your application goes to and spreads over the skin as equally as possible, instead of wetting or smearing the outside surface of the fleece, where it will be of more harm than benefit.

On the Disorders of Sheep. The following observations are extracted from an *Essay on Sheep*, written by H. D. G., a scientific shepherd, who has been acquainted with *sheep* *husbandry*, as practised by the *wool-growers* of *Saxony*, France, and other parts of Europe.

"Almost all the disorders which attack sheep are caused by the want, and seldom or never by the excess of activity in the vital organs. The nerves are very susceptible, but seldom act with great force, and whenever they are powerfully excited, this excitement soon passes off and leaves the animal extremely weak. It follows from this, that most of the means required for the cure of diseases among sheep should be calculated rather to excite than to allay the activity of the functions of life. A few of the most common diseases among sheep deserve to be particularly noticed.

"*The Rot* exhibits itself scarcely at all externally. The blood loses its high color and tendency to coagulate, and becomes watery. The first perceptible symptom, therefore, is the loss of the bright red appearance about the eyes; the lips and inside of the mouth also become pale, as well as the skin generally under the wool. The animal continues to feed well and does not grow poor, although the natural vivacity is diminished and some signs of weakness occur.

"The disease commonly gains strength in the winter. Watery swellings are formed, particularly under the chin, which are often absorbed and then reappear. Soon after these the animal generally dies, without showing any symptoms of violent pain. Ewes attacked by this disease die most commonly about the time of dropping their lambs. The body on opening exhibits copious collections of water about the chest and entrails; the blood is extremely pale as well as the flesh. This disorder is unquestionably caused by feeding in swampy grounds, and a few hours are sufficient to fix it upon a sheep. It is increased by damp, foggy weather, while, on the other hand, dry warm weather and high pasture, especially where there are many aromatic herbs, are sometimes sufficient to counteract the first symptoms and effect a cure. This disorder, however, when it has reached such a point that a common observer may notice the symptoms, is probably incurable. At a very early stage a cure is possible, if the flock is kept carefully on high land where aromatic herbs are abundant, and particularly among juniper bushes, and in bad weather carefully housed and well fed. Horse-chestnuts are an excellent article for fodder in this case; also a mixture of juniper berries, wormwood, sage, gentian, angelica roots, willow bark, and other bitter herbs, with a little salt and grain, which they will eat of their own accord, or if not, it should be administered in small quantities in the morning before they are driven to pasture. If the rot makes its appearance in a decided manner before the winter sets in, it is useless to attempt any thing more than to fatten the animal as soon as may be and sell him to the butcher. The rot certainly is not infectious, and it very often occurs that only a few sheep are attacked in large flocks; and generally, in such cases, if the shepherd is honest, the disease may be traced in every case to some swamp or other wet place, where these particular sheep may have strayed.

"*The Mouth and Hoof Distemper.* These complaints seem to have a mutual connexion, since the former, which is the mildest, very often precedes the latter. In the mouth, the principal evil to be feared is, that the sheep become emaciated from the inability to eat. The best remedy is to bathe the parts affected with a strong decoction of sage, mixed with an equal quantity of vinegar and a little honey. If the blisters continue to spread, half an ounce of blue vitriol should be added to a quart of this mixture. The disorder in the hoofs is soon discovered by lameness, and if this is evidently not produced by any external injury, and especially if several sheep in a flock are attacked at the same time, great care should be taken to obviate the effects of this disorder. The best remedy is a poultice of dough, or fat loamy clay, which should be applied to the foot by means of a little bag, but not tied hard to the ankle, and kept constantly wet with vinegar, till a swelling appears on the upper side of the foot or in the cleft of the hoof. This should then be opened with a sharp knife and the dead hoof pared off. The wound must be washed with cold water and sprinkled with dry vitriol. The lame animals should remain carefully separated from the sound ones, and the washing and sprinkling with vitriol repeated till the cure is effected. This disease is not only contagious, but also infectious, in the highest degree, and oftentimes so violent as to produce caries in the bone after the hoof is destroyed.

"*The Itch or Scab.* This disorder is dreaded more than any other, and did, in fact, more damage in many districts than any other, until the proper mode of treatment was discovered. The scab is certainly contagious, and may readily be propagated by merely touching the skin of a healthy animal with matter from a pustule on another sheep; but as far as my observation has extended, the infection is not conveyed through the atmosphere, though it often seems to be epidemic, and particularly in very damp summers, which affect sheep in many other ways so unfavorably.

"It is discovered by the animal's constantly rubbing or scratching itself, and making at the same time a peculiar motion with the lips ; the scabs are sometimes dry and sometimes moist, and spread very rapidly, though the animal continues healthy in other respects, and generally more lively than before. Afterwards, however, the disorder becomes internal, the sheep becomes emaciated, and dies from weakness and pain. If the scab is observed at an early period it may be easily cured, or at least prevented from spreading. One of the best remedies is a strong decoction of tobacco, to be applied to the diseased parts after scratching off the scabs with a comb or other instrument. The decoction of tobacco mixed with lime-water and oil of vitriol, and used constantly, for some time, will generally effect a radical cure; another excellent remedy is a decoction of hellebore mixed with vinegar, sulphur, and spirits of turpentine. Internal remedies are of no use, except when the disorder has induced other complaints by weakening the general health.

"*The Sheep-Pox.* This disorder is contagious, and propagates itself by exhalation from the sick to the healthy animal, but it has not yet been discovered how far these exhalations may extend. If, however, it appears in a neighbouring flock, care should be taken to mitigate its effects by a general and careful inoculation, since it is certain that the disorder is less violent if taken by inoculation than in the natural way. The operation is perfectly simple and easy. The animal is laid on its back and held by two or three men, while the operator introduces the matter, from a pustule five or six days old, in two or three places between the legs or on the tail. The lancet should be introduced in a slanting direction under the skin about an eighth of an inch, and when it is withdrawn, the skin should be pressed down upon it so as to wipe off the matter and leave it in the wound. A pustule is formed generally in four days, and reaches its greatest size on the sixth, when a few others generally appear near the first. Soon after his, the usual symptoms of fever and general eruption take place, which last is, however, more regular and safe, than if the animal had taken the disease without inoculation. The only care necessary during the progress of the disorder is to keep the sheep in a cool and airy situation. Internal remedies are not required, but the sores should be often washed with a strong infusion of camomile flowers, in which a little blue vitriol has been previously dissolved, and afterwards dressed with a salve made of yolks of eggs and turpentine, mixed with a little powdered charcoal.

"*The Reeling Sickness* is never infectious, but generally incurable. Its first symptoms are a weakness in the gait, and a disposition in the animal affected to remain separate from the flock. The head is thrown into an unnatural posture, generally on one side. The animal then begins to turn round, always in one direction, stumbles and falls repeatedly, sometimes with the head under the body, then ceases to feed, and soon dies. Lambs and yearlings only are usually liable to this disorder, and very rarely sheep over two years old. The seat of the disorder is always to be discovered on the brain, where one or more blisters are formed and filled with a watery secretion. The origin of this complaint, and of course the proper preventive treatment, remain as yet undiscovered. A cure is sometimes effected by an operation through the skull to let off the water. The first step in this case is to examine the skull carefully in search of a soft spot in the bone, which usually indicates the spot affected. The skull is then perforated with a *trocar*, accompanied by a tube through which the water may escape; after which the tube also is withdrawn and a few drops of the essence of myrrh applied to the aperture. This operation is sometimes successful, but more often the reverse. If it succeeds, however, in only one cure out of five, it seems worth the trial, since without some relief the sheep must certainly perish.

"*Swelled Paunch.* When sheep or other ruminating animals eat more than they can digest, the food ferments in the stomach, emitting great quantities of gas, which stretch this organ so as to draw together its apertures, the paunch becomes excessively distended, the lungs oppressed, the breath and pulse obstructed, and the death is very sudden. This effect may be produced by fodder of any kind, but most readily by such as the sheep prefer, especially if they are not accustomed to it. Green clover and lucerne have, therefore, often been observed to bring on this disorder; but it is nevertheless certain, that neither of these substances are in themselves injurious, since I have known sheep accustomed to them eat their fill day after day, for months together, without suffering any ill consequence. Any young green feed is more likely to be hurtful in this way than dry fodder, but only when eaten in excess after long abstinence. If the approach of the swelling is observed in season, it may be prevented by violent friction of the back and belly and driving the sheep rapidly. These remedies are assisted by a previous dose of lime-water, which should be repeated half an hour afterwards, taking care that the lime is good and not previously air-slacked. If the attack is so violent as to leave no time for these remedies, an opening must be made in the paunch with the trocar and sheath; an operation which cannot easily be described, but may be exhibited without any difficulty to any person unacquainted with it."

A writer in "The New York Farmer," says: "A gentleman who was losing his sheep, without apparent cause, had occasion to use some clay about his house in the winter, and observed that his sickly flock ate it with avidity; he caused a load to be placed in their yard, much of which was devoured and his sheep speedily recovered." As a cure, therefore, I would recommend clay to be placed in the sheep-yard, which can, at worst, do no harm, as the animals will not eat it unless prompted by instinct; or, when it is practicable, the boughs or branches of resinous trees, as the pine and hemlock, may be given to the flock in limited quantities. Roots of any edible kind will also be highly serviceable. As a preventive in future, I advise sheep-farmers to raise and lay in a good stock of ruta baga or other turnips, which are not only the healthiest but cheapest food for the winter consumption of sheep.

Worms in the head of Sheep. There exists in some parts of the country a species of fly, which naturalists call *œstrus ovis*, of the same genus with that which deposits eggs in the hair of horses, and causes bots. This fly attacks sheep, from about the middle of August to the middle of September, deposits its eggs in the nostrils of the animals, and causes those *worms* which so frequently destroy them. The "Mechanic's Gazette" recommends, as a preventive, "covering the nostrils of sheep with a list of gauzy substance, through which the animal can breathe, and keeping it in its place by some adhesive substance." We doubt, however, the practicability of "keeping it in its place" by any "adhesive substance." Another preventive which sheep-owners tell us is effectual, is to keep the noses of the sheep constantly smirched with tar, from about the middle of August to the latter end of September. If the sheep swallow some of the tar, so much the better, as it prevents or cures the rot, and confirms their health.

If the fly has performed its mischievous function, and the seeds of the disorder are already sown, you may make use of the following:

"Take half a pound of good Scotch snuff, pour two quarts of boiling water on it, stir it and let it stand till cold; inject about a table-spoonful of this liquid and sediment up each nostril of the sheep with a syringe. This must be repeated three or four times, at proper intervals, from the middle of October to the 1st of January; the grubs are then small and are much easier destroyed than afterwards, and have not injured the sheep, as they will if deferred until later. Half an ounce of assafœtida, pounded in a little water and added to the snuff, will make it more effectual. The owner of the sheep need not be alarmed, when the operation is performed, to see the sheep very drunk and apparently in the agonies of death, as they will in a few minutes recover. Dry snuff may be blown up the nose with a quill, and have a good effect; but it is a tedious, dirty job."

Instead of "Scotch snuff," a decoction of tobacco will answer the purpose. A gentleman who owns a large flock of sheep informs us, that he had used it with perfect success. Spirits of turpentine have been injected into the nostrils of sheep, as a remedy for worms; but that substance appears to possess one material disadvantage, which should preclude its use for that purpose, viz. when thrown into the nostrils it kills the *sheep* as well as the worms.

Mr. Alexander Reed, of Washington, Pennsylvania, in an article on the management of sheep, published in "The New England Farmer," (Vol. III. p. 60,) observes, that "daubing the sheep's nose with tar is considered as a protection against this enemy. What experience I have had is rather calculated to strengthen this opinion. I have always made free use of tar among my sheep, and I do not know that I ever lost one by the worms in the head."

It is said by some writers that if sheep are kept in good condition there is no danger of their suffering greatly from worms in the head; as they will be strong enough to expel the insects by sneezing. This may be; but still, the application of tar to the noses of the animals would prove serviceable by preventing their being teased by the fly, which causes great pain and distress at the time the nits are deposited, as well as eventuates in the disease of the sheep.

HORSE. One of the most useful of tame quadrupeds The marks or evidences of a good one are these; a high neck, a full breast, a lively eye, a strong back, a stiff dock, full buttocks, ribs reaching near to the hips, well-made hoofs, rather large, and a good gait.

The size of a horse should be in proportion to the work in which he is chiefly to be employed. Small sized ones often prove good in the saddle. They are apt to be hardy, and, in proportion to their size and the quantity of their eating, usually are the most profitable. Plough horses, and all draught horses, should be large, as their weight is of importance in drawing; as it is often inconvenient to put two horses to one plough, especially in horse-hoeing. Largeness is also of importance, when they are used single, in journeying, as they most usually are, in a chaise or sleigh.

A horse's manner of going is a matter of no small importance. The ambling gait, or what in this country is vulgarly called pacing, is not good, either for the horse or the rider. It is tiresome to both. It habituates a horse to carry his feet too near to the ground, so that he is the more liable to trip and stumble.

The method so much practised formerly, in this country, of teaching horses to pace swiftly, and racing in that gait, is highly pernicious. It puts them to a much greater strain than running; and numbers have been thus ruined. Some colts naturally amble, and others trot. But all may be made to trot, if due care and pains be taken with them while they are young, or as soon as they are first ridden. In a carriage an amble is tiresome to a horse, appears highly improper, and is disgusting to every one; and I do not see why it should appear at all more tolerable in the saddle. When any change of gait is wanted for the ease of the rider, the canter is to be preferred, than which none can be more easy.

The way of breaking a young horse that is mostly used in this country is highly absurd, hurtful, and dangerous. He is mounted and ridden before he has been used to the bridle or to bearing any weight on his back. If he will not go forward, he is most unmercifully beaten; by which his spirits are broken and his strength impaired. If he rears up, he is pulled backwards, with the risk of hurting both horse and man. If he runs and starts, as he probably will, under such management, he flings the rider, perhaps is frightened, gains his liberty, and is encouraged to do just so the next opportunity; and the unfortunate rider blesses himself, as he has reason to do, if he escapes without broken limbs. Or, if the horse should chance to go kindly, the rider continues the exercise till the horse is fatigued, discouraged, and injured.

Instead of this mad management, the way practised in the older countries should be adopted. Let a horse first of all be tamed with the bridle, by leading him again and again; in the first place, after or by the side of another horse; and after he walks well, bring him to trot after his leader. In the next place, put on the saddle, and lead him in that, time after time. Then lay a small weight on the saddle, and if he be apt to start, fasten it, that it may not be flung off; increasing the weight from time to time, till he learns to carry what is equal to a man's weight. Lastly, let a man gently mount him, while another holds him by the bridle, and fix himself firmly on the saddle The place of riding is recommended to be a ploughed field. Let him thus be ridden with a horse going before him, till he learn the use of the bit, and will stop or go forward at the pleasure of the rider, and without the application of much force. Being exercised in this manner a few times, and treated with all possible gentleness, there will be no more occasion for leading him. He will go well of himself; and be thoroughly broken, without so much as giving him one blow, and without danger or fatigue to the horse or his rider. And, what is much to be regarded, the horse's spirits will be preserved, though he be sufficiently tamed. In teaching a horse to draw, gentleness must be used. He should be tried first in company with other horses, whether in carting or ploughing; and the draught should not be so heavy as to fret him or put him to great exertion till he has learned to draw steadily. After this he may be put to draw light loads by himself. Lastly, he may be put to a pleasure carriage, but coupled with another rather than alone, and to a sleigh rather than a chaise.

It may be taken for a general rule, that the gait which is easiest to a horse will be the easiest to his rider; for jaded horses, it has always been observed, are apt to go hard, and to tire their riders.

The feeding of horses has not been sufficiently attended to in this country; which is, doubtless, one reason why they are in general so mean and despicable. Too many keep horses who cannot well afford to feed them. They should neither run upon the roads and commons, nor in pastures that are filled with wild and water grasses. They love a dry pasture, not too much shaded, and short grasses of the best kinds. Clover and white honey-suckle, both green and dry, are excellent food for them. It nourishes them well, and prevents costiveness, which is very hurtful to them. The best of clover hay will keep them as well as most other kinds of hay with oats.

To fit a horse for a journey he should not be suffered to grow too fat and gross He should for some time be kept in the stable rather than in the pasture, and fed mostly with hay and provender; but rather sparingly if he incline to be fat. He should have exercise daily, to harden his flesh and keep him in the habit of travelling. He should be shod some days before he begins a journey, that the shoes may be well settled to his feet, and the nails a little rusted at the points, that they may hold the faster. And the pads of the saddle should be well fitted to his back, so as to fill the hollows, and bear equally on every part. And while he is on the journey, he should be stabled every night. It is destructive to expose a horse to the dampness and cold of the night after severe exercise. But it would be best if neither horses nor any of our cattle were wholly confined to dry meat in winter. Horses indicate this by their eating snow with their hay. Set a basket of snow within reach of a horse, when he is at his manger, and he will take a mouthful from each alternately. Of all juicy food for horses in winter, writers on husbandry seem to give carrots the preference. They have been found by experience to answer well instead of oats for laboring horses; and to fatten those which are lean.

He that would be sure to keep his horse in good order must beware whom he suffers to ride him, and must see that he is never abused. Profuse sweating should always be avoided. And when a horse is much warmed by exercise he should not be exposed to cold air nor night dew, and much less to rain and snow. If he cannot be instantly rubbed down and housed when warm, he should be covered with a blanket; and he should always have a dry stable, and be well littered. The neglect of these precautions may bring on incurable disorders.

Horses should not be too much deprived of the liberty of motion, as they too often are. Close confinement after hard labor will be apt to abate their circulations too suddenly, make them chilly, and stiffen their joints. To be deprived of motion is bad for man and beast. Horses therefore should not be straitened for room in their stables. Stables should not be so low as to prevent their tossing up their heads as high as they please. Some stables have so little room overhead as to bring horses into a habit of carrying their heads too low; they become afraid to lift them up. They should also have room in their stables to turn their heads to any part of their bodies, that they may defend themselves from the biting of insects, allay itching, &c. And their halters should always be so long and their stables so wide, that they may lie down conveniently. Nor should horses be so placed as to be able to deprive each other of his fodder.

When horses are kept in stables, as they generally are in the coldest half of the year, they should be daily dressed, as it is called. The curry-comb and the brush should be well used on all parts of their skin which are covered with hair. This increases perspiration through the pores of the skin, which is necessary to health; and causes the blood to move faster in the veins. This treatment will not only cause them to look better, but they will have better health, and more activity and courage. They will digest their food better, and be better for service. But if rubbing and friction be wholly neglected, or slightly performed, the hair will appear dry and rough; the perspirable matter hardens in the pores of the skin, or remains lodged at the roots of the hair, and has the appearance of a dirty white dust, and sometimes like small scales, attended with itching. More especially is rubbing necessary for horses when they are growing cold after being sweated by labor. In such cases it should never be omitted.

Columella observes, "that the bodies of cattle ought to be rubbed down daily, as well as the bodies of men"; and says, "it often does them more good to have their backs well rubbed down, than their bellies well filled with provender."

But in warm weather it would be best for them, that they should not have the confinement of the halter, nor even of the stable. A small spot of feeding ground, if it were only a few rods, adjoining to the stable, and the door left open, that a horse may go in and out alternately as he pleases, would greatly conduce to the health of the animal. This degree of liberty will be most needful when the flies are troublesome, and be better for him than confinement to a stable that is perfectly dark. In fly time, it gives a horse much ease and comfort to smear his limbs, neck, and head, with rancid fish oil, or something else that will keep the flies from attacking him. And in all seasons, when horses have been heated with exercise, they should be well rubbed or curried.

When a horse runs in a pasture during the grass season, he should have some shelter; not only a shade to defend him from the intense heat of the sun, but a shed, or a clump of trees, that he may retreat from the inclemencies of the atmosphere.

But horses that are daily worked in summer should be mostly kept upon green fodder in stables, rather than grazed in pastures. The tendance of them will not be so burdensome, with a spot of high and thick grass at hand, as leading them to and from a pasture, at the distance of a quarter of a mile. This will prevent their being often chilled by feeding in wet nights. A large quantity of manure will thus be saved. And a very small quantity of land will answer, in comparison with what it takes for the pasturing of a horse. Keeping a scythe and a basket at hand, a horse may be foddered in this way in two or three minutes; and by the time that the whole spot has been once mowed over, that which is first cut will be grown up again. Where a number of horses are soiled, a pair of poles, or a hand-cart, will be better than a basket to carry the hay to them. This practice, called soiling, answers well near cities and large towns, where lands for pasturage are not plenty; and where, by means of the plenty of manure, lands may be made to yield the greatest crops of grass. For very thick grass should not be fed off; because the greater part of it will be wasted by the trampling and the excrements of animals.

When grain is given to horses, it is an economical practice to have it either ground or boiled. When horses are soiled, or fed in a stable on green grass, it should be cut and carried in during the morning while the dew is on.

A disorder, called *ptyalism*, has for some years past been gaining ground among horses in various parts of the United States, which is an excessive watering or slavering at the mouth. Various causes have been assigned for this disorder, but none of them satisfactory. Soiling them is, however, a certain remedy.

The following remarks on the diseases of the horse were written by Dr. J. B. Brown, of Boston, and were first pub lished in "The New England Journal of Medicine and Surgery":—

"The horse is not subject to fever; that is, he has no simple, idiopathic fever; no cold, hot, and sweating stage, as man has. The feverish action which the heart and arteries of the horse sometimes assume is sympathetic, and is always preceded by some local affection. It is a disease of irritation.

"The eyes of the horse are subject to a species of cataract that affects no other animal. It arises from a constitutional disease, brought on by bad stabling. It is never produced by local injury. This species of cataract commences with an inflammation of the conjunctiva, without any apparent cause. Local applications have no effect in removing it. The only rational method of treating it is to remove, if possible, the constitutional disease, and improve the health and condition of the animal.

"Oxen and cows have the disease called bots in their skin, but in the horse this disease (if it may be so called) is confined to the stomach.

"Farcy and glanders, are diseases peculiar to the horse. They are contagious diseases, but may be produced without contagion, by bad stabling. The poisonous matter of farcy will produce glanders, and *vice versa*. Farcy is now ascertained to be a disease of the superficial absorbents; whereas, in all the old books on the veterinary art, it is represented as a disease of the veins.

"A horse glandered has the whole mass of blood contaminated. This may be considered by medical gentlemen as an important fact, as it goes to prove the doctrine of humoral pathology. That the whole mass of blood is diseased, in a horse affected with glanders, has been proved by the following experiment, made by Mr. Colman, professor at the Veterinary Institution, England.

"He took a young, healthy ass, an animal, as he states, peculiarly susceptible of the disease, and introduced a pipe having a stop-cock into the jugular vein, united by means of an ureter to another pipe, which he introduced into the carotid artery of a glandered horse. He then bled the ass to *death* by opening his carotid artery, and turning the stop-cock, admitted the blood of the horse into his vessels, and resuscitated him. The result was, that the ass became violently glandered. He inoculated other asses from the matter produced in him, and was able to carry on the same disease.

"Corns in the feet of horses are very unlike corns on the feet of the human subject. There is nothing which grows in the feet of horses that constitutes corns. There is no increase of substance. Corns in the feet of horses are mere bruises. Every body has seen or experienced the effects of bruises upon the human nail. Corns in the feet of horses are injuries of a similar nature. The red appearance which they have is caused by an extravasation of blood, which spreads itself among the fibres of the horny hoof. Corns are generally occasioned by the shoe. They may, however, arise from other injuries. They are easily cured by suitable remedies and a proper mode of shoeing, unless the inflammation occasioned by the injury has been of long standing, and assumed a chronic character. In this case, the cure is more tedious.

"*Horse-ail.* Strictly speaking, all diseases of horses are *horse-ails*; but custom has given this epithet to a species of disease very common among our horses. The disease referred to is called *strangles*, in most of the old books on farriery. It consists in an inflammation of the membrane lining the nose and the arytænoid cartilages. This disease is accompanied by a cough and discharge from the nostrils. The cough is sympathetic, and is produced by the extreme sensibility of the membrane thus inflamed. The lightest dust, or even a drop of water lodged upon this membrane, in this irritable state, produces coughing. The inflammation sometimes extends to the lungs, and then this disease is accompanied with a disease of the chest, and requires speedy and energetic treatment, as inflammation of the lungs *in the horse* is apt to terminate speedily in gangrene. Copious bleeding, from six to ten quarts at first, and smaller bleedings afterwards, as the state of the case may require, and small doses of aloes, from one to two drachms, given daily, have been found the most successful remedies in inflammation of the lungs. Drastic purgatives should be avoided, as they increase the irritation and put the life of the horse in extreme hazard."

The following judicious remarks on the management and diseases of horses, &c., are taken from an English publication.

"*The stable.* As the preservation of health ought to be considered as an object of equal, if not superior, importance to that of curing or alleviating disease, and as it can only be accomplished by a proper management of the horse with respect to feeding, exercise, and the general economy of the stable, I think it proper to begin with this subject.

"In the construction of a stable there is, perhaps, no circumstance more deserving attention than that of ventilation, or of having contrivances for the ready admission of fresh air, and for the escape of that which has been rendered impure by breathing; and it is really extraordinary that so little attention should have been paid to so important a circumstance. Grooms in general make a point of closing every aperture they can find; and if, at any time, they are prevailed upon to open a window, it is commonly so small, and so inconveniently situated, as to be of but little service. Let any one for a moment consider how foul an atmosphere must be produced in a close stable, in which several horses are kept, by the constant exhalation of unwholesome vapors from the litter, by the steams of perspiration from the skin, and by noxious airs from the lungs, and he will not be surprised at the long catalogue of diseases to which this improper treatment must subject these useful animals.

"If a doubt remain in the mind of any one as to the impropriety of such close stables, let him enter one early in the morning, on its being first opened, and he will experience such a painful sensation in the eyes, and so violent a cough, as will afford him the most convincing proof of the noxious and stimulating nature of such an atmosphere; yet such is the obstinacy and ignorance of grooms in general, that they cannot be prevailed upon to abandon this injurious practice. Even at this time stables are generally built too low, and unprovided with effectual means of ventilation.

"A stable should be as lofty as it can be made conveniently, at least twelve feet; the foul air will then circulate in the higher parts, and the animal will not be constantly breathing an unwholesome atmosphere, which he must do when the ceiling is scarcely higher than his head. Proper apertures must also be made in the ceiling, communicating with the atmosphere by square wooden tubes, so contrived as not to admit the rain into stables; the foul air and other unwholesome vapors will then readily pass off, while a proper quantity of fresh air may be admitted by means of windows. The next circumstance to be attended to is nearly connected with, and not less important than ventilation; namely, the so constructing a stable as to be able to regulate its temperature, or keep the air at any degree of heat that may be thought proper It is generally allowed, that a uniform temperature in a stable is very desirable; and it is certain, that many of the diseases of horses are caused by sudden changes in this respect. Even slight variations of temperature, if frequent, are injurious; yet few stables are to be found where this inconvenience is effectually guarded against. To accomplish this desirable purpose, the windows should be in different sides, so that when a cold wind blows from any point it may be shut out, while fresh air is admitted by the opposite window. There should be several of the apertures we have described in the ceiling, that they may be occasionally shut, either wholly or partially, so that, by means of these and the windows, the temperature can at any season be easily regulated, according to the weather or state of the horse's health, more accurately if a thermometer be kept; an instrument which appears to be a necessary appendage to a well-conducted stable. If, during the cold days of winter, the contrivance we have proposed should be found insufficient to raise the temperature of the stable to the desired point, the air may be easily warmed to any degree by means of stoves placed on the outside, with iron chimneys passing through the stable. It may be placed in the saddle-room; this, however, is scarcely necessary.

"Light is also a thing of much importance in the construction of a stable; and, for the purpose of admitting it readily to every part, the windows should be large and properly placed. There is no doubt that the eyes of horses are often injured by dark stables; and when a horse is just taken from a dark situation, it is easy to perceive that light at first irritates the eye and gives pain; and this is more remarkable when he is brought suddenly into the sunshine; nor is it to be wondered at, that so delicate an organ as the eye should suffer materially from the frequent repetition of this sudden change.

"Though a light stable is desirable, the sunshine should not be allowed to fall on the eyes of a horse as he stands in his stall; nor should the walls or ceiling be of a white color, as, under such circumstances, the eyes would be over stimulated and rendered weak. And when it is considered how liable horses are to diseases of these organs, and how frequently they terminate in blindness, no one will think any circumstance tending to their preservation too trifling to be noticed. With regard to the best color for the walls and ceiling, a stone or dove color is perhaps to be preferred, and may be made by mixing a little lampblack, ivory-black, or blue-black with the common white-wash.

"The door should be larger and higher than we usually see it; for horses are very liable, in passing through a narrow or low one, to strike their hips or heads.

"The stalls should not be less than six feet wide, and the sides sufficiently high to prevent any sort of contact or communication between the horses. They should also be of considerable depth, that a horse may not, by drawing back, have the power of kicking those in the adjoining stalls. The floor of the stall should be made of hard brick, as a more equal surface is then formed than can be obtained by paving with pebbles. Very little declivity is necessary to drain off the urine; and as great inconvenience sometimes arises from suffering a horse to stand in a stall where the fall is considerable, creating unnecessary exertion in the muscles of the hind leg, and keeping the ligaments constantly in a tense state, it has been recommended to make the drain in the middle of the stall, whereby the hind and fore feet of the horse might stand on a level. In whatever way, however, the stall is made, it should be carefully cleaned, twice a day, that none of that putrescent matter may accumulate which generates ammonia, or that pungent vapor which is so abundantly found in close, filthy stables. An iron rack is preferable to one of wood, being more easily kept clean, and furnishing no splinters; which, where wooden racks are used, sometimes injure the mouth. The manger may be so contrived as to slide into the wall like a drawer; and then, while the groom is wisping him, he would have nothing to lay hold of with his mouth, by which practice horses often become crib-biters. The height both of the rack and manger should be such as to enable the horse to feed with the greatest ease. The former is sometimes made so high that the horse is obliged to exert the muscles of his neck considerably in order to reach it; and this has been so placed, under an idea of its having a tendency to make him carry his head more gracefully; it is more probable, however, that the only effect of it is to make the horse uncomfortable while feeding. It has been recommended, as the best plan, to place the racks on a level with the manger, so that the horse may feed as he does in a state of nature. This plan is a good one. It has been tried both for wagon and saddle horses, that is, both single and double, and found to answer extremely well. It was observed, however, that some horses would throw out part of the hay with their noses when it was of a bad quality; but by placing one or more bars across on the upper part, from the front to the back, this was effectually prevented. The manger should be rather wide, and not less than eighteen inches deep. When a horse is fed principally with chaff or cut hay, a deep manger is particularly necessary, as many horses, in endeavouring to pick out the oats from the chaff, will throw out a great deal of the food with their noses when the manger is shallow. In larger stables, where many horses are kept, each stall is to contain two horses, which will require a space of twelve feet. A manger is placed at each end, and the hay crib in the centre. A very short halter is sufficient to allow the horses to lie down, and then there is no danger of entangling themselves with it, an accident that often occurs when long halters are used. La Fosse, in his *Manuel d'Hippiatrique*, says, that the fall in the floor of the stall should not be more than one inch to two yards. The gutter behind the stall is commonly too deep, and often so placed as to be in the way of the horses' hind feet. When a stable is properly attended to, scarcely any gutter is required; and when there is one, it should be very shallow and wide.

"When a stable is ventilated by means of a tube or chimney, it should be placed in the centre of the ceiling, the opening in which should be large, in proportion to the number of horses kept; it cannot well be too large, but may be contracted upwards, so as to have a conical shape, or it may be made so as to resemble a dome or cupola. It should be carried a few feet above the top of the roof, and have lateral openings, by means of slanting boards, but closed on the top; by which contrivance there would be a free communication with the atmosphere, and the rain would be effectually excluded.

"There have been different opinions held with respect to the removal of the litter during the day; but when we consider how rapidly and abundantly ammonia or the volatile alkali is generated in it, and how injurious that vapor is to the eyes and lungs, there can be no doubt of the propriety of removing it. Dr. Egan, of Dublin, has discovered, that the urine of the horse begins to generate volatile alkali very soon after it is voided; and it is well observed by the same author, that if this vapor be capable of painfully stimulating a sound and healthy eye, its effects upon one that is inflamed, and consequently extremely irritable, must be both highly painful and prejudicial to the organ. In confirmation of this opinion, the author relates the following experiment. A horse laboring under inflammation of the eye was removed from the stable, where he kept both eyes constantly shut, and placed in a cool, airy situation; in the space of half an hour he began gradually to open his eyes, and in the space of two or three hours he kept them open boldly. The horse was again placed in the stable, and in a few minutes he began gradually to close the eyes, and after an hour or two kept them constantly shut. Not satisfied, however, with this experiment, though it seems pretty conclusive, the horse was again removed to the cool situation, and the same effect followed as at first. If the vapors produced by foul litter prove so injurious to the eyes, it cannot surely be less prejudicial to the lungs; and it is highly probable that if coughs are not produced in this way, they are often aggravated and rendered incurable by those irritating effluvia. Another evil to be considered is the propensity observable in many horses to eat their litter. This is often the case with such as have a chronic cough, or are disposed to become brokenwinded, or have worms; and in all these diseases there is nothing, perhaps, more likely to increase them than the animal's eating foul litter. It must be obvious, that horses employed in severe labor should be allowed to lie down whenever they are inclined to do so; but even then all the litter may be turned out early in the morning, the floor of the stall swept perfectly clean, and a bed of fresh straw put in. If the foul litter be spread abroad in the open air, and shaken up two or three times during the day, the greater part would be again fit for litter, and, with the addition of a little fresh straw, would serve to replace that upon which the horse has rested during the day. It has been said, that horses which stand constantly on litter are apt to feel the difference of the road and become tender-footed. Mr. Clark observes, that the heat arising from the litter occasions a more than ordinary derivation of blood to the legs and feet; and hence arise swelling or gourdiness of those parts, greasy heels, and stiffness or numbness. If the horse lies down for relief, the heat of the litter soon forces him to get up again, and after repeatedly lying down, and forced to get up immediately from the above cause, he attempts it no farther; he stands upright, or perhaps a little straddling, often shifting the weight of his body from one leg to the other. This erect position, in which he is obliged to stand, increases the swelling of his legs, &c., and recourse is then had to bleeding, purging, diuretics, &c.

"Lord Pembroke, in his 'Military Equitation,' observes that after working, and at night of course, as also in lameness and sickness, it is good for horses to stand on litter; it also produces staling, &c. At other times, it is a bad custom; the constant use of it heats and makes the feet tender, and causes swelled legs; moreover, it renders the animal delicate.

"Swelled legs may be often reduced to their natural size merely by taking away the litter, which, in some stables, where ignorant grooms and farriers govern, would be a great saving of physic and bleeding, besides straw.

"Lord Pembroke has noticed, by repeated experiments, that legs swell or unswell, by leaving litter or taking it away, like mercury in a weather-glass. Mr. Blaine is of opinion, that the custom of standing on litter ruins more horses than all the mails or stagecoaches put together; that it is the fruitful source of contracted feet, and brings on that ruinous affection with more certainty than the hardest work. In my own stables (he says) no litter is ever suffered to remain under the fore-feet during the day. The horses stand on bare bricks, which, in summer, are watered to make them more cool; by which means I have experienced astonishing benefit. Behind, a little litter is strewed, because they are apt to kick and break the bricks with their hind feet; and because the litter thus placed sucks up the moisture of the urine, which would be detrimental to the hinder feet, which are more liable to thrushes than contraction."

Colts. "Colts are usually foaled about the beginning of summer, and it is the custom to let them run till Michaelmas with the mare, at which time they are to be weaned. When first weaned, they must be kept in a convenient house, with a low rack and manger for hay and oats; the hay must be very sweet and fine, especially at first, and a little wheat bran should be mixed with their oats, in order to keep their bodies open, and make them eat and drink freely. When the winter is spent, they should be turned into some dry ground, where the grass is sweet and short, and where there is good water, that they may drink at pleasure. The winter after this, they may be kept in the stable, without any farther care than that which is taken of other horses. But after the first year, the mare foals and horse foals are not to be kept together. There is no difficulty to know the shape a foal is like to be of, for the same shape he carries at a month he will carry at six years old, if he be not abused in after keeping."

"We often hear it lamented, that our breed of horses is bad. But I am convinced that, as our colts are managed, if we had any other breed, we should soon make it appear to be as mean as our own, if not worse. The abusing of colts in the first winter is the principal cause of their proving so bad; for our farmers seldom allow their weaned colts any food besides hay, and that is not always of the best kind. So that they seldom fail of being stinted in their growth, in the first winter, to such a degree, that they never get the better of it. A colt that is foaled late should not be weaned till February or March, and should have oats during the whole of the winter. In some countries, they allow a young colt fifteen bushels. We need not grudge to feed them with meal, oats, and bran, besides the best of clover hay; for they will pay for it in their growth. After the first winter, they will need no extraordinary feeding till they are grown up. Were the above directions observed, we should soon see an improvement of our breed of horses. They would be capable of doing much greater service, and be likely to hold out to a greater age." — *Deane.*

For farther remarks on the management of colts, and training or breaking them for service, see page 64 of this work.

MANGEL-WURTZEL. *Field Culture of the Mangel-wurtzel Beet and the Sugar Beet. Soil and Preparation.* The soil for these roots should be a loam, inclining to clay, in good tilth, well manured, and made fine to a good depth. John Hare Powel, Esq., corresponding secretary to the Pennsylvania Agricultural Society, in giving an account of his mode of cultivating this crop, says, "My soil was not naturally strong; it has been gradually so much deepened as to enable Wood's plough, No. 2, drawn by four oxen, to plough fourteen inches deep. Fresh barn-yard manure was equally spread upon the surface, and ploughed under in the early part of April, in quantities not larger than are generally used for potato crops in this country. Early in May, the land was twice stirred with Beatson's scarifier, harrowed, rolled; after stirred, harrowed and rolled again in the opposite direction." The soil, on which Messrs. Tristram Little and Henry Little, of Newbury, Massachusetts, raised their premium crop, in 1824, is a clay loam. In 1823, about three-fourths of the same was sowed with onions, and manured with about eight cords of compost manure to the acre. The other quarter was sowed with wheat without manure. In the fall of 1323, there were about ten cords of compost manure drawn on the lot, and put in a heap. Most of the said compost was drawn from the salt marshes, when ditching the same; the other part was from the barn-yard. In the month of April, 1824, the heap was thrown over, and well mixed.

Planting. Colonel Powel says, "The holes for the seeds were made by a wheel, containing pegs in its circumference, which penetrated the ground about an inch, leaving intervals of four inches; the rows were made two feet asunder; two capsules were dropped into each hole; the wheel of a common barrow was passed over them, thus compressing the earth, and leaving a slight rut for the retention of moisture."

Messrs. Tristram and Henry Little observe, that, "Between the 8th and 11th of May, the land was ploughed and sowed in the following manner. After one deep ploughing, the ground was furrowed two and a half feet apart, and the manure put into the furrows, and covered with a double mould-board plough; a roller was then passed on the top of the ridge, and the seed dibbled in with the finger over the manure, about six or eight inches apart." The quantity of seed, according to English writers, is four pounds to an acre Mr. David Little, in obtaining a premium crop, sowed four pounds, but observed, that he thought half that quantity would have been sufficient.

After-culture. Colonel Powel says, "A small cultivator, which I had contrived for the purpose, was drawn between the rows soon after the weeds appeared; a three inch triangular hoe removed the alternate plants, leaving the others at distances varying from eight to twelve inches asunder. The cultivator was twice used before the 20th of July. The heavy rains of August made another hoeing necessary, and surcharged the ground so much with moisture, that all roots increased much less in that month than during the same time in the two last years." The Messrs. Little, "in the course of the season, thinned their plants, and left them from six to twelve inches apart in the rows. They were once hoed, and ploughed three times between the rows." Mr. Powel, in raising a previous crop, had placed the rows thirty inches apart, and left the plants six inches apart in the rows. He says, "I this year desired smaller roots, which might grow so closely as by their leaves to protect the soil as much as possible from the rays of the sun. My cultivator, by its peculiar form, enabled me to cut off the weeds when the plants were so young, that, if I had applied the plough, their crowns must have been covered in many instances by earth occasionally falling from its land side. The failure, which attends the cultivation of most root crops in drills, proceeds from the neglect of weeds in their early stages. Four or five days of delay frequently make the difference of fifteen days in the labor of making clean an acre of ground. The same weeds which a boy with a sharp shingle could remove at the commencement of one week, may, before the end of the next, require the application of an implement drawn by a horse. I ascribe my success, in great measure, to the use of *Wood's extraordinary plough*, which enters the soil more deeply, and pulverizes it more perfectly, than any other I have ever seen, with equal force, in any country; to the use of cultivators, which complete the production of fine tilth; to the destruction of the weeds on their first appearance, — leaving the smallest space upon which a horse can walk between the rows; and, above all, to *planting the seeds of a proper kind upon a surface which is kept perfectly flat.*"

General Remarks. Agriculturists have not agreed, whether it is most expedient to plant the seeds of this root on ridges or on a level. Colonel Powel condemns planting on ridges in this country, as a practice not adapted to our soil and climate, in which vegetables are very liable to suffer by drought. He says, "Among the various practices into which we have been seduced by the plausible theories of the advocates of European husbandry, there is none which appears to me more absurd than that which has led us to drill or dibble our crops on ridges. The English farmer wisely contends with the evils produced by too much rain; the American husbandman should as anxiously guard against his most formidable enemy, drought. I am inclined to think that there is no crop cultivated in this State (Pennsylvania) which ought not to be put on a flat surface." The climate of New England, especially its northern part, is not so warm and dry as that of Pennsylvania, and in that part of the United States, perhaps, the nature of the soil should decide the question; if dry, level planting, or if moist, ridge planting should be adopted.

We have heard complaints from American farmers, that the seed of this root is slow and uncertain in coming up.

Perhaps the seed, or soil, or both, may sometimes be too dry at the time of sowing. A writer in the "English Farmer's Journal," says, "I have of late years steeped my seed for at least forty-eight hours. I made an experiment with twenty sound seeds, not steeped, twenty steeped twenty-four hours, and the same number steeped forty-eight hours; every seed of the latter produced plants, which came up two or three days sooner than either of the others, and some of those not steeped did not come up at all." Mr. Cobbett, in treating of the culture of the common garden beets, (American Gardener, par. 198,) directs to soak the seed four days and nights in rain-water before it is sowed; and observes, that the mangel-wurtzel should be cultivated in the same manner as the other kinds of beets. American writers, so far as we have observed, give no directions for soaking the seeds of this vegetable before planting; and it is possible, that the omission of this part of the process may cause the slowness and uncertainty of vegetation complained of. The capsule, or husk, which contains the seeds, is dry, and it requires a long time for the moisture which it may derive from the earth to penetrate this integument, so as to cause the seed to sprout. But if the soil be very moist at the time of sowing, soaking the seed had better be omitted.

Much has been written and said on the subject of stripping these plants of their leaves for feeding cows and other economical purposes. An English writer observes, that six or seven crops of leaves and stocks may be taken off during the growth of the root. Women and children can take off the leaves, which is done as follows; they should place their hands on each side of the root, at the foot stalks of the leaves, leaving about six of the smallest central leaves between the fore-finger and thumb of each hand; (the small leaves are to be left on the root to grow, to make a fresh top;) then, spreading the hand flat with their face downwards, push them both at the same time towards the ground, and thus, by one motion, will the whole of the top of each root, except the small leaves to be left to form a fresh head, be removed without unsettling the root or its fibres, which would check its growth. Some affirm, that stripping the plant of its leaves is no injury to the root, and others are of opinion that the root is injured by this means. We have doubts, whether, in field cultivation, it will often be deemed expedient to expend time and labor in this manner. The thinnings, or superfluous plants, however, should be preserved, as they make excellent food for milch cows or store swine.

Some cultivators affirm, that it is never worth the trouble to transplant these roots to fill vacancies. "I have seen," says an English writer, "much labor and expense employed in transplanting into vacant spots, when the seed has not been dibbled thick enough, but have never seen the transplanted roots worth half the trouble; the tap-root being broken in the drawing, nothing but the top and useless rough roots and fangs are produced. It has been remarked by other writers, that the most common cause of failure in transplanting this root is the taking them up when too small, before the plants have obtained strength and size sufficient to bear the operation of transplanting.

Use. The following remarks are from a paper communicated to the trustees of the "Massachusetts Agricultural Society," by J. Lowell, Esq., president of said Society. They are derived, principally, from a French publication, by the Abbé Rosier.

"This root is very little affected by changes of weather. It is attacked by no insect; drought affects but little its vegetation. It prepares the land extremely well for other crops. It may be sown and treated precisely like the common beet, except that it ought to stand eighteen inches asunder. In good land, they often weigh nine or ten pounds, and are stripped eight or nine times. In a light, sandy, but well manured soil, they sometimes weigh fourteen and even sixteen pounds each! The first crop of leaves in France is taken off in the latter end of June, or the beginning of July. In this country, probably, the latter period would be preferable. The lower leaves, those which incline towards the ground, are those which are taken away, and care must be taken to preserve the top leaves, or the crown of the plants. The leaves may be taken off every fifteen days after the first gathering. Oxen, cows, and sheep devour them greedily, and fatten readily upon them. All domestic poultry eat them readily, when chopped fine and mixed with grain. Horses will feed upon them very well, mixed with chopped straw. Hogs also fatten upon them.

"Cows fed upon this root solely give a greater quantity of milk and cream, and of better quality for the first fifteen days, after which they grow too fat, and the milk lessens. The food of cows must therefore be varied. Oxen and sheep fatten very well upon them. Cows should have grass in proportion of one-third to the beet leaves, or every third day they should be turned to grass. In this mode their milk will be excellent. The trouble of gathering the leaves is less than that of gathering any other green fodder. It may be done by children, while men are required to cut other green food for cattle. It is the surest crop, since the plant will stand the longest droughts. The roots are gathered and treated like those of the common beet. The skin is very tender, and care should be taken to handle them so as they may not be wounded, as they will, in that case, not keep so well. In order to preserve the seed in purity, care must be taken to change the ground in which the seed beets are planted. The seed can be preserved, after it is gathered, three or four years, without injury. In giving these roots to cattle for food, they are first washed, and then cut up into pieces about the size of a nut. It is always best to accompany them, when given to horned cattle, with clover, or other hay or straw ; and if the hay or straw has been previously cut fine, it will be preferable. If horses are fed with this root, with a proportion of hay or cut straw, (half of each,) they will be fat, vigorous, and healthy. If they are worked severely, a little oats or corn may be added. It is thus they are treated in Germany, where this root stands in the stead of meadows or grass lands, and whose excellent horses are well known.

"Hogs fed upon them raw, after they have been cut up fine and mixed with milk or other drink, fatten as well upon them as upon boiled potatoes, by which the fuel and trouble of boiling is saved.

"As to the quantity given to animals, much will depend on the proportion of other fodder which you allow them. Cows fed twice a day in winter upon eighteen pounds of these roots at each time, together with four pounds of hay or chopped straw, will give as much and as good milk as in summer, and they will be kept in the best possible state

"Oxen fed with forty weight of these roots per day, with ten pounds of hay, for one month, and after that with fifty weight per day of the roots alone, will be fat enough for sale in two months more.

"Man can eat this vegetable throughout the year ; it is agreeable and healthy. No insect attacks it, and it suffers but little from the variety of the seasons. The leaves of this plant form alone an excellent food for every species of domestic quadruped, during four months in the year. Turnips and other vegetables are, besides, liable to be destroyed by insects, whereas this beet is not. The roots can be pre served eight months in a sound state, while turnips are of little value after March. In some soils turnips will not grow, particularly in those which are very stiff or strong. The root of scarcity grows everywhere. The milk of cows fed on turnips has a bad taste; that of those fed on this plant is excellent, as is also the butter made from it. This forage on green fodder comes also at the hot seasons, when almost all other green food is scarce, and sometimes not to be procured. Cattle never get tired of it. In many parts of Germany, where it is raised with success, they prefer it to every thing else to fatten those large herds of cattle which they annually export to France. In feeding cattle with beets, the same dry food must be given which is usually given with turnips."

Colonel Powel observes, "My neat cattle prefer mangel-wurtzel to any roots which I have offered to them. I have found its effects in producing large secretions of *good* milk very great. I selected, in November, two heifers of the same breed, and very nearly of the same age, and in similar condition; they were fed in adjoining stalls, and have been fed regularly three times a day, by the same man. One of them has had three pecks of mangel-wurtzel and four quarts of corn-meal daily; the other, four and a half pecks of mangel-wurtzel. The last, which has had mangel-wurtzel alone, is in the condition of good beef; the other is not more than what graziers call half fat.

"The application of mangel-wurtzel as food for sheep is not the least important of its uses. Ewes yean usually at the season when grass cannot be supplied. The health of themselves and the thrift of their lambs essentially depend upon succulent food being had. I am inclined to think, that no small portion of the success which English breeders have met, is to be ascribed to the large stores of roots which they always have at command. It cannot be denied, that Indian meal will of itself, in most cases, produce extraordinary fatness, as well as great size; but I have been led to believe, that diseases are early engendered by this species of forcing, which is always expensive, and too often eventually destroys the animal which has been thus reared."

Messrs. T. and H. Little observe, as to the value of the roots for feeding stock, "There is a variety of opinions; but, from a number of years' experience, we think them a valuable addition, and highly worth cultivating. Comparing them with English hay, and we know of no better standard, in our opinion, three tons of mangel-wurtzel, or potatoes, (of the two, we value the mangel-wurtzel the highest,) are equal to one ton of hay, for feeding stock generally; but for milch cows, we think two tons of equal value. For feeding store swine, mangel-wurtzel is the only root that we know of which we can cultivate and feed to profit. Six bushels of raw mangel-wurtzel we think equal to one bushel of Indian corn"

Quantity to an Acre. The premium crop of the Messrs. Little was thirty-three tons ten hundred weight and fourteen pounds on an acre. Colonel Powel inclosed certificates to the president of the Pennsylvania Agricultural Society, showing that sixteen hundred and thirty-four bushels of mangel-wurtzel, weighing seventy-eight thousand four hundred and forty-eight pounds, were produced upon one acre and fourteen perches; and a part of the same field, containing thirteen contiguous rows, produced at the rate of two thousand and sixty-five bushels per acre, weighing forty-four tons five hundred and twenty-seven pounds. In Great Britain, it is said that upwards of sixty tons have been raised on an acre.

Gathering and Preserving. In gathering the roots, care should be taken to cut off the leaves about half an inch above the crown, as they will not keep so well if cut more closely. Messrs. Tristram and Henry Little say, "As to the best mode of preserving them, we have tried divers ways, — by pitting them, by putting them into a barn and covering them with hay, and by putting them into the cellar; the last mode we think the best." Colonel Powel observes, that one of his crops was "piled in a cellar, in rows, as wood, and covered with sand." A writer in the "English Farmer's Journal" observes, that he has practised, with success, the following mode of preserving this root: "I pack it in long heaps, about seven feet wide at the bottom. I begin by forming the outsides with the roots, not stripped of their tops; tops outwards; the internal parts to be filled with roots without leaves; continue one layer over another, until the heap is about six feet high, and about two feet broad at top, which may be covered with straw and earth; the ends of the heap should be covered in the same way. The leaves form an efficient covering against rain and frost."

Mr. M'Mahon's mode of preserving beets and other roots is as follows: "Previous to the commencement of severe frost, you should take up, with as little injury as possible, the roots of your turnips, carrots, parsneps, beets, salsify, scorzonera, Hamburg or large-rooted parsley, skirrets, Jerusalem artichokes, turnip-rooted celery, and a sufficiency of horseradish for the winter consumption; cut off their tops, and expose the roots for a few hours, till sufficiently dry. On the surface of a very dry spot of ground, in a well sheltered situation, lay a stratum of sand two inches thick, and on this a layer of roots, of either sort, covering them with another layer of sand, (the drier the better,) and so continue the layers of sand and roots till all are laid in, giving the whole, on every side, a roof-like slope; then cover this heap or ridge all over with about two inches of sand, over which lay a good coat of drawn straw, up and down, as if thatching a house, in order to carry off wet and prevent its entering the roots; then dig a wide trench round the heap, and cover the straw with the earth so dug up, to a depth sufficient to preserve the roots effectually from frost. An opening may be made on the south side of this heap, and completely covered with bundles of straw, so as to have access to the roots at all times, when wanted either for sale or use.

"Some people lay straw or hay between the layers of roots, and immediately on the top of them; this I do not approve of, as the straw or hay will become damp and mouldy, and very often occasion the roots to rot, while the sand would preserve them sweet and sound.

"All these roots may be preserved in like manner in a cellar; but in such a place they are subject to vegetate and become stringy earlier in spring. The only advantage of this method is, that in the cellar they may be had when wanted more conveniently during winter than out of the field or garden heaps.

"*Note.* All the above roots will preserve better in sand than in common earth; but when the former cannot be had, the sandiest earth you can procure may be used."

RUTA BAGA. The following is an account of the method of cultivating ruta baga, adopted by Rev. Henry Colman, in obtaining a crop for which he received a premium of twenty dollars from "The Massachusetts Agricultural Society," in 1830; from "The New England Farmer";—

"On an acre, on one side of the field, there were gathered seven hundred and forty-one baskets full; and forty baskets of the above-named weighed at the town scales two thousand seven hundred and fifty pounds net weight. This, allowing fifty-six pounds to a bushel, the standard weight assumed by the Society, would give a crop of nine hundred and three bushels to the acre.

"The turnips were planted on the 29th of June and 2d of July; about one pound and a half of seed was used for the acre; and they were gathered and stored in cellars and in the barn, in the last part of November.

"The ground on which they grew is a good soil, neither wet nor dry, and bore the last year an abundant crop of onions, and corn the year preceding the last. It was well manured at both times, and in fine tilth. It was manured with at least six cords to the acre of barn manure, the last spring, and sowed again to onions; but the seed entirely failing, it was ploughed, harrowed, furrows struck out, and about eight cords of barn manure spread in the furrows; ploughed again, so as by a back furrow to form a ridge over the manure, and the seed sown with a small drill-harrow on the ridges, making the rows about twenty inches asunder. As soon as the plants were of sufficient size, a drill-harrow, with small shares fixed to it, to cut off all the weeds, was passed through the rows; and the plants thinned with a small weeding hoe to the distance of about eight inches apart, and the vacant places filled up by transplanting from the supernumerary plants. They were once more harrowed and cleaned; which was a very small labor; and owing to the very unpropitious weather were not harvested until very late. Some of them were very large; one weighed fifteen pounds, and many were nearly as large. The exact expense of cultivating the acre cannot be estimated, as it was intermixed with other farm work; but the whole, from the sowing to the gathering, was not two-thirds of the labor usually bestowed on planting, cultivating, and gathering an acre of potatoes.

"My Swedish turnips the last year were fed off to my oxen, dry cows, young stock, and fatting sheep. To the cattle they were of very great advantage; and for feeding sheep, they proved worth from ten to twelve and half cents per bushel. Three years' experiment has increased their value very much for these purposes in my own estimation."

A correspondent in "The New England Farmer," (Vol XI. p. 277,) says:

"The soil for the culture of the ruta baga must be rich and dry; and the more it inclines to a sand loam the better. Clay is the worst, and wet soils will not answer at all. My general practice has been, to manure well a piece of pasture, or clover ley, from which the hay has first been cut, plough it handsomely over, and harrow it well. I sow in rows, at two and half or three feet, with a drill-harrow. The sooner the preceding operations succeed each other the better. I have sown broad-cast, but the expense of thinning and culture is increased. A man will drill in three or four acres a day. We allow a pound of seed to the acre, though half this, properly distributed, is enough. Sow from the 26th of June to the 10th of July.

"*Culture.* I use a cultivator, that may be graduated to the space between the rows, drawn by a horse, as soon as the plants can be well distinguished. This is repeated in a few days, back and forward, and the implement carried so close to the drills, as to leave only strips of from four to ten inches, which are then thoroughly cleaned with a skim hoe, and the plants thinned to eight and ten inches' distance. The cultivator soon follows for a third time, and if necessary the skim hoe, when the crop is generally left till harvest. The great aim is to extirpate the weeds, and to do this while they are small.

"Harvesting is postponed as long as the season will permit. The roots are then pulled up and laid on the ground, the tops of the two rows towards each other. The pullers are followed by a man or boy with a bill-hook, who with a light blow cuts the tops as fast as three or four can pull. Three men will in this way harvest, of a good crop, three hundred bushels in a day. The tops are gathered into heaps and taken to the yard in carts daily, for the stock, until they are consumed. An acre will give from five to ten cart-loads of tops. The roots are piled in the field if dry; the pits, two or two and a half feet broad, covered with straw and earth, and as cold weather approaches, with manure, to prevent frost. N. B. With a crow-bar make one or more holes on the crown of the pit, which must be left open, to let off the rarefied air and prevent the roots from heating.

"*Use.* The tops serve for autumn. As soon as the mild weather of spring will justify, I break through the frost, and take the contents of a pit to my barn, and cover the roots with straw or hay. From thence they are fed to my stock, being first chopped up with a *snik*, (Dutch meat-chopper,) or spade. They are excellent for sheep, especially for ewes that have young; and hogs and horses eat them freely. Steamed, they are used in the north of England for horses as a substitute for grain. I have fattened sheep and bullocks upon them with profit. They constitute, particularly from February to June, an excellent culinary vegetable for the table. A bullock will thrive fast upon two bushels a day, and will consume hardly any hay, and requires no drink.

"*Product and Cost.* My average crop has been six hundred bushels per acre, though others have raised much heavier products. The cost in manure and labor, when they are secured for winter, has been from two to three cents per bushel.

"N. B. Cattle or sheep fattened upon this root should be kept from eating them for eight or ten days before they are slaughtered, otherwise the meat will have an unpleasant savor. J. B."

ENGLISH TURNIPS. Every farmer will find it profitable to raise a quantity of these roots. The mangel-wurtzel and the ruta baga, useful as they undoubtedly are, will not completely supersede, nor altogether supply the place of the old-fashioned English turnip. In the "Memoirs of the Board of Agriculture of the State of New York," (Vol. I. p. 26,) we find the following remarks on the best mode of cultivating this valuable root:

"There is no difficulty in raising turnips on new land; but it is very desirable to know the best mode of raising them, at least a small patch every year, on old farms. Mr. Henry De Bois, of Rensselaer county, and Major E. Cady, of Columbia county, say, that they have succeeded in obtaining good crops several years in succession by the following process. Turn over a turf of old sward the first week in June. Yard your cattle at night on this, in the proportion of six head at least to a quarter of an acre, until the 20th of July. Then harrow lengthwise the furrows, so as not to disturb or overturn them, and sow in the proportion of about half a pound of seed per acre.

"If it is not convenient to yard cattle upon it sufficiently, about two inches of well-rotted manure, harrowed in as above, will do as a substitute. Mr. C. R. Colden applies the manure by strewing it in shallow furrows, two feet apart; then buries the manure by two side furrows, and harrows the ground level, lengthwise of the furrows. This method requires less manure, and he has the advantage of hoeing the turnips in drills."

We recollect likewise, that we have read, in several of our New England newspapers, that fine turnips have been raised by ploughing up old sward ground some time in June, harrowing well, and sowing from the 1st to the 20th of July, and this without the application of manure. But there can be no doubt that folding sheep or horned cattle on the land thus ploughed would very much enhance the crop.

All American writers on this subject, whose works we have perused, advise to sow seed of the common English turnip as late as about the middle of July. They tell us, that late sowed turnips are much the best for the table, and that they are less liable to be injured by insects, if sown so late, than when sown much earlier in the season.

Turnips are frequently, if not most generally, raised in the United States as a second crop; and no doubt this practice is often very eligible, and may be perfectly consonant with the soundest maxims of good husbandry. But when it is intended to *make the most of your crop of turnips*, or to obtain as great a product as possible for the purpose of feeding cattle, we do not perceive any objection to giving turnips a larger portion of the season to grow in than has been with us the general practice.

An English writer on agriculture, whose remarks on this and other agricultural topics appear to us to be judicious, and to display a thorough knowledge of the subjects of his essays, says, "It is not pretended, that there lies any solid objection to early sowing of turnips, simply considered; on the contrary, such seems to be the most proper means of obtaining a full crop; but the advantages of early sowing, whatever they be, are given up, and the season postponed from near three to five months, by way of retarding the growth of the crop, that it may last to a later period in the spring, and receive less damage from the frosts than that to which it would be liable in its early maturity. The disadvantages attending this plan are a crop far inferior in weight to what might be obtained from the land, and the very common risk of destruction from drought and fly. The weight and perfection of the turnips being the objects, the land may be got ready for them as for any other early spring crop, and the seed sown with the first warm showers. This will afford ample scope for resowing, should the first seed fail, of which, however, granting it to be good, and the land sufficiently fine, I believe there is scarcely any risk. As to any advantages of a crop previous to the turnips, nothing scarcely can stand in competition with the first crop of roots.

"The true turnip soil is a deep sand or sandy loam. Every gardener knows the proper time to begin hoeing turnips. In general, when the plants spread a circle of about four inches they are ready for the first hoeing. They are commonly left about a foot asunder. The second hoeing three weeks after the first."

Those who desire to go extensively and successfully into the turnip culture should raise their own seed from the finest transplanted roots. An English cultivator says, "It is wonderful what a small quantity of seed suffices for an acre of ground, and indeed equally so how it can be delivered and spread over such a breadth. A pint might be more than enough, but it is usual to broad-cast a quart on an acre."

Dr. Deane's "New England Farmer" asserts, that "the quantity of seed sown on an acre is never less than one pound, frequently a pound and a half, and by some two. According to the same work, it is very necessary for the success of the crop that a heavy roller be passed over the field immediately after harrowing in the seed, provided the ground is sufficiently dry, or as soon as it is in a fit condition. By this means the clods are broken, and much of the seed that would otherwise be exposed to birds, &c. will be covered, and the surface rendered smooth and compact thereby, and consequently more retentive of moisture, which will greatly promote the vegetation of the seed and growth of the plants."

If a quantity of lime were sowed over the field immediately after putting in the seed, it would probably preserve the crop against insects and prevent the turnips becoming spongy, as well as increase their size. Unleached ashes, soot, and plaster, have also been highly recommended as manure for turnips. Thomas Mellville, Jun Esq., of Pittsfield, Massachusetts, in raising a crop which received the premium from "The Massachusetts Agricultural Society, in 1817, and which amounted to about seven hundred and fifty bushels to the acre, sowed his seeds in drills of twenty-eight inches the 21st of June, on ground previously well manured. The following day sowed on the acre thirty bushels slacked lime and fifteen bushels house ashes.

What we have said about the *early* sowing of turnips we would merely suggest as a hint, or something to be thought of, and perhaps become a matter of experiment. It appears to us that our custom of sowing turnips so late in the season, as is commonly practised, is an usage borrowed from British husbandry, without duly considering the difference of our climate from that of Great Britain, and the different uses to which this crop is commonly applied in the two countries. In England they usually feed turnips off the ground with sheep; or draw them for neat cattle during the winter, as fast as they are wanted, and often let them stand in the field till spring, to supply green food for sheep at the time of their yeaning, &c. But in the United States, this crop must be harvested in autumn and secured from frost; and it would seem to be desirable that they should have had time to obtain their full growth before they are gathered.

Ellis, an old writer on husbandry, says, "Turnips sooted about twenty-four hours after they are up will be entirely secured from the fly." Some advise, and it may be well, if not too much trouble, to leach soot and sprinkle the young turnips with the liquor. M'Mahon, in treating of the cultivation of turnips, says, "the plants should be left from seven to twelve inches every way; this must be regulated according to the strength of the land, the time of sowing, and the kind of turnips cultivated; strong ground and early sowing always producing the largest roots."

The width of the hoe should be in proportion to the medium distance to be left between the plants, and this to their expected size. The critical time of the first hoeing is, when the plants, as they lie spread on the ground, are nearly the size of the palm of the hand; if, however, seed-weeds be numerous and luxuriant, they ought to be checked before the turnip plants arrive at that size; lest, being drawn up tall and slender, they should acquire a weak and sickly habit. A second hoeing should be given when the leaves are grown to the height of eight or nine inches, in order to destroy weeds, loosen the earth, and finally to regulate the plants; a third, if found necessary, may be given at any subsequent period. Here will the farmer exclaim against the expense and trouble of hoeing; but let him try one acre in this way, and leave another of the same quality to nature, as is too frequently done, and he will find that the extra produce of the hoed acre will more than compensate for the labor bestowed.

Loudon says, archbishop Garrie, a Scottish gardener of merit, tried steeping the seed in sulphur, sowing soot, ashes, and sea-sand along the drills, all without effect. At last he tried dusting the rows, when the plants were in the seed-leaf, with quicklime, and found that effectual in preventing the depredations of the fly. "A bushel of quicklime," he says, "is sufficient to dust over an acre of drilled turnips, and a boy may soon be taught to lay it on almost as fast as he could walk along the drills. If the seminal leaves are powdered in the slightest degree, it is sufficient; but should the rain wash the lime off before the turnips are in the rough leaf, it may be necessary to repeat the operation, if the fly begins to make its appearance."

POTATOES. "Above two hundred and forty years have elapsed since the introduction of the potato into the British isles. During that period, it has been gradually making its way in the favor of the inhabitants; but its progress for a long time was very limited. So slight, indeed, was the estimation in which it was held, even after the era of the revolution, that we find the celebrated Evelyn, in the year 1699, giving directions to plant potatoes in the worst grounds. 'Take them up,' he says, 'in November, for winter spending; there will enough remain for a stock, though they be ever so exactly gathered.'

"The potato began however to be extensively cultivated about the middle of the last century; and now it is grown in every farm and cottage garden, almost without exception.

"If experience seemed to have proved beyond a doubt that this root may be deemed one of the most important vegetable productions; if, in the face of every assertion to the contrary, it be found a very valuable and, generally speaking, a most salubrious article * of diet, and admirably adapt-

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* It has been argued that the potato, at least under certain conditions, possesses a slightly poisonous quality. The idea may have originated in the botanic character of the plant; in fact, it is one of the family of the nightshade, the *solanum tuberosum* of Linnæus, and of the old natural order *luridæ*, which included plants whose appearance was described as being "dusky, dismal, and gloomy." The genus or family *solanum* is the type of that numerous tribe or order in the *natural* system, *solanea*, many of whose members exhibit great beauty of appearance and possess very useful properties.

ed to supply nutritious food for animals and poultry; it becomes a serious interest to determine with certainty that mode of culture which shall, at all times, and in all situations, tend to produce the heaviest crops, and of the finest quality.

"Mr. Knight, the president of the 'English Horticultural Society,' has observed, that he planted his potatoes upon a soil *naturally poor* and very shallow; upon a rock full of fissures, *giving no more manure than is usually given to a crop of turnips;* the manure was mixed up with the soil, and not thrown into the drills at the time of planting. The plants suffered from drought during a part of the year; nevertheless, he had very good crops from many varieties. These varieties he had himself originated from seed; and they possess the important quality of *scarcely producing any blossoms*, and therefore the vital powers of the plant are entirely employed in the production and support of those tuberous processes, the potatoes, which are the sole object of the cultivator. The produce of two of the sorts is stated as follows; of the one, twenty-three tons two hundred weight seventy-six pounds; and the other, twenty tons two hundred weight one hundred and one pounds, per acre. Of four other varieties he observes, 'the produce exceeded twenty tons each per acre, all of good quality.' If the reader will reduce these weights to pounds, he will find them (reckoning the yield at twenty tons only per acre) to amount to five hundred and sixty bushels, each of eighty pounds' weight.

"One of the chief, if not the primary, agent in effecting vegetable developement and maturity, is light. Deprive a plant of *that*, and you either paralyze the operation of its vital principle, or induce imperfect and diseased action. The leaves of vegetables are the media upon which light acts; and, therefore, it should be the object of the gardener so to arrange his crops, that the utmost breadth of their foliage may be exposed to the full influence of the solar rays. Hence, the rows of potatoes ought to *point north and south;* for, in the first place, plants so exposed command the greatest breadth and duration of light; and in the second, the sun, at the time of his highest meridian altitude, that is, at the hour of noon, shines directly along the extent of the rows; his light is also most equally distributed upon the whole foliage as he approaches to and recedes from the meridian. The perpendicularity of growth, which is of considerable importance to the complete success of the crop, is less likely to be disturbed by this mode of arrangement, than by any other that has heretofore been employed. It is generally the practice to plant small potatoes, or sets of large tubers, cut with one or two eyes to each. These sets are planted in rows, from sixteen to twenty inches asunder, and the sets about half that distance, or nine inches apart, without any consideration being had to the aspect or direction of the rows. As the stems advance in growth, they are very liable to fall over and become entangled one with another, thus intercepting the solar light, which then acts unequally upon the disorderly masses of foliage. Hence the crops become very unequal in point of bulk and weight.

" Mr. Knight's philosophical directions lead to a very different result. He recommends the planting of whole potatoes, and those only which are of fine medium size, none to be of less weight than four ounces; and he often prefers those which weigh six or eight ounces. The earlier sorts, and, indeed, all which seldom attain a greater height than two feet, are to be planted about four or five inches apart in the rows, centre from centre, the crown ends upward; the rows to be from two feet six inches to three feet asunder. The late potatoes, which produce a haulm above three feet in height, are to be placed five or six inches apart, centre from centre, in rows four or five feet asunder.

" When potatoes are thus planted in rows pointing north and south, the utmost energy of the light will be exerted, not only upon the foliage of the plant, but upon the surface of the intervening spaces of ground. If we suppose that the main crops will be planted at the latter end of March and during the month of April the sun's meridional altitude will be advancing daily for at least nine weeks; and during that period, the developement and growth of the stem and leaves will be in a state of rapid progress After the turn of days, and when the plants have attained their full growth, the sun will continue to exert its most powerful influence. Should the ground be of a proper texture and quality, the plants will stand erect, and the maturing process will proceed without interruption; and after favorable summers, wherein there have been regular and moderate supplies of rain, particularly during May and June, with a prevalence, however, of bright sunshine, the crops of potatoes will be regular, the tubers generally of a medium size, and the quality mealy, and altogether superior. If the soil be a strong mellow loam, enriched with much manure, the haulm will, in all probability, grow too rank, and finally fall over; nevertheless the large spaces between the rows will greatly remedy this evil, for the sun's beams will act upon one surface at the least, and the matting and other injurious consequences resulting from close drilling will be prevented or obviated. We hear everywhere of potato plants running away to haulm, and thus expending their vital energy upon useless stem and foliage, instead of employing it in the production of tuberous roots. Now this remark is wholly opposed to philosophical fact, for invariably the strongest and heaviest bulk of potatoes is found attached to the most luxuriant haulm. The evil of over-luxuriance is not to be referred to the paucity of tuberous product, for that is always great; it is a consequence of an over-rich soil, which causes the haulm to grow so tall as to fall over, become entangled, and thus to lose the maturing influence of light. Hence, such haulm seldom ripens in due time; it remains green even in December; and the tubers, though large, numerous, and heavy, are immature, void of mealiness, and vapid in flavor.

"A fact of great importance to the growers of potatoes remains to benoticed. The *outside rows*, and all *single rows*, will be found to produce far greater crops than any of the interior rows of a plot in the garden or field. This depends upon a variety of causes, the chief of which is, the more perfect exposure of the foliage to the agency of air and light. Mr. Knight obtained from one outside row, of an early seedling variety of the preceding year, which was two feet six inches exterior of an adjoining row, '*a produce equivalent to more than fifty-eight tons per acre.* No conclusions,' he says, 'can be drawn from the amount of produce of an external row. I mention it only to show *the enormous influence of light.*'

"Experience has established the truth of this philosophical remark. Every cultivator, who has the opportunity of cropping upon long detached slips, in airy, open situations, should make the experiment of close planting in single rows, either whole potatoes or well-cut sets from very large potatoes, each to contain two eyes at the least. These sets should be taken from the crown end, or middle of the tuber, and not from the lower or root end. Sets may be planted at still less distances in the rows than whole tubers; and although the preference ought, in all cases, to be given to a southern direction, where such can be conveniently given, still, for absolutely single rows, it is not indispensably required, because air and light will act on each side of the stem and foliage, and there will be no intervening shadow.

"The *soil* ought to be sandy and light, though moderately rich; that is, if fine, mealy, and dry potatoes be required. It should not by any means be glutted with manure, and need not be deep.

"With respect to the properties of this vegetable, and the purposes to which it may be applied, the following observations of an eminent physician, Dr. Pare, may not be deemed inappropriate.

"'Potatoes are found to produce, First, Cottony flax from the stalk. Second, Sugar from the root. Third, Potass by consumption. Fourth, Vinegar from the apples. Fifth, Soap, or a substitute for bleaching, from the tubercles. And, finally, when cooked by steam, the most farinaceous and economical of all vegetable food.'

"It is also known that much farina, or rather *amylum*, or starch, is yielded by grinding and washing the pulpy mass. This starch may be employed as a substitute for that made from wheat; and as an article of diet, prepared as Indian arrow-root. It can also be introduced in making bread, though there is some difficulty in the manipulation. As food for all cattle of the farm, — horses, cows, pigs, and likewise for poultry, potatoes are all but invaluable. Every creature appears to relish them, particularly when they are steamed or carefully boiled. It would be well worth the intelligent farmer's while to pay great attention to the use and effects of potatoes, raw and boiled. It is asserted, that a cow may safely eat them in a raw state to the extent of, perhaps, fifty pounds per day, provided the eyes have broken and begun to shoot. Whenever they be given raw, however, they should be chopped into pieces to prevent accidents. The utility of raw potatoes is, however, doubted by many, and therefore the experiment requires close observation; perhaps straw, hay, and chaff, might be employed as a very proper adjunct, with a few ounces of salt added to each feed. Whenever steaming in the large way can be profitably employed, it must be an advantage for pigs and poultry particularly; and, in all cases, it would greatly tend to prevent the possibility of the danger of suffocation which has been known to result from the hurry and greediness with which cattle devour the raw roots." — *British Farmer's Magazine.*

Potatoes renewed from Seed. "Take the apples in the beginning of October [or whenever they are ripe] before the frost has hurt them; hang them up by the foot-stalks, in a dry closet, where they will not freeze; let them hang till March or April; then mash the apples, wash the seeds from the pulp, and dry them in a sunny window. Sow the seeds in a bed, about the 1st of May. When the plants are four or five inches high, transplant them into ground well prepared, one or two plants in a hill. They will produce full grown apples, and some of the roots will be as large as hen's eggs. But if the seeds were sown in autumn, some of them would come up in the following spring. Nothing is more common than their appearance in fields where potatoes have been raised the preceding year."

The process stated in "Monk's Agricultural Dictionary," an English work, is similar to that mentioned by Dr. Deane, excepting that it is recommended in that work to hang the apples of the potatoes in a warm room till Christmas. Then wash out the seeds, spread and dry them in paper, and preserve them from damps till spring.

Potatoes thus obtained will produce roots of the full size the second season after sowing, when their qualities may be more fully ascertained than they could well be the first season. They will be found to vary very much from the kinds, from which the apples were gathered. It will be expedient to plant but one potato of the regenerated sorts in a hill, that you may keep each variety separate. Then, by keeping the produce of each hill by itself, and boiling one or two of each, you may ascertain which is best for the table; and by observing the quantity of produce in each hill, you may form a pretty good estimate relative to the productiveness of each sort. In that way you may introduce new varieties of potatoes, and supply yourself and neighbours, and eventually he market, with potatoes of a quality much superior to any of the worn-out and degenerate kinds which are now to be found. The subject is of importance, and the man who will introduce new and improved sorts of potatoes, will deserve but little less of his country than he who improves our breeds of domestic animals.

COTTON. (*Gossypium.*) There are many varieties of this plant, all of which are natives of warm climates, but only four are cultivated. In Georgia and South Carolina two kinds are planted. One grows on the upland, has a short staple, with green seed. Another has black seed, and is cultivated on the islands near the coast.

Pierce Butler, Esq., a successful cultivator, has given the following directions for raising this article :

"If the land has been recently cleared, or has long remained fallow, turn it up deep in winter; and in the first week in March bed it up in the following manner. Form twenty-five beds in one hundred and five square feet of land; (being the space alloted to each laborer for a day's work ;) this leaves about four feet two and one half inches from the centre of one bed to the centre of the next. The beds should be three feet wide, flat in the middle. About the 15th of March, in latitude from twenty-nine to thirty degrees, the cultivator should commence sowing, or, as it is generally termed, planting. The seed should be well scattered in open trenches, made in the centre of the beds, and covered. The proportion of seed is one bushel to one acre; this allows for accidents occasioned by worms or night chills. The cotton should be well weeded by hoes once every twelve days till blown, and even longer if there is grass, observing to hoe up, that is, *to* the cotton, till it pods, and hoe down when the cotton is blown, in order to check the growth of the plant. From the proportion of seed mentioned, the cotton plants will come up plentifully, too much so to suffer all to remain. They should be thinned moderately at each hoeing. When the plants have got strength and growth, which may be about the third hoeing, to disregard worms and bear drought, they should be thinned, according to the fertility of the soil, from six inches to near two feet between the stocks or plants. In rich river grounds, the beds should be from five to six feet apart, measuring from centre to centre ; and the cotton plants, when out of the way of the worms, from two to three feet apart. It is advisable to top cotton once or twice in low grounds, and also to remove the suckers The latter end of July is generally considered a proper time for topping. Gypsum may be used with success on cotton lands *not near the sea.* In river grounds draining is proper ; yet these lands should not be kept too dry. In tide lands it is beneficial to let the water flow over the land without retaining it. In river lands a change of crops is necessary. From actual experiment it has been proved, that river tide lands, having the preceding year had rice sown on them, yielded much more cotton the succeeding year than they would have afforded by a continuation of cotton.

"The mere growing of cotton is but a part of the care of the planter; very much depends on classing and cleansing it for market, after it has been housed. Sorting it before it goes to the jennies, moteing and removing any yellow particles, are essential to assure a preference at a common market of competition."

TOBACCO. (*Nicotiana.*) This plant is named from Tobago, one of the Caribbee islands. It was first introduced into England by the famous Sir Walter Raleigh, and from thence it spread over the other parts of Europe.

In order to raise the young plants, it is recommended to burn over the surface of a piece of ground early in the spring, rake it well, and sow the seeds. When the plants have acquired leaves the size of a quarter of a dollar they are fit for transplanting. They require a dry, light, rich soil, made mellow by ploughing, and folding is also advised. Dr. Deane observes, that, the common way of raising tobacco in cow-pens and barn-yards is detestable. The taste of such tobacco is intolerable. Transplant the young seedlings when the ground is wet, as you would cabbage plants. Set them about three and a half feet apart, and weed them as you would growing cabbages. Destroy the large green worms, which are apt to infest this crop.

When the plants have grown about three feet high, a little less or more, as they may be more or less thrifty, their tops should be broken or cut off, excepting those designed for seed, which should be the largest. The tops should be taken off so early in the summer as to allow time for the upper leaves to grow to the same size as the lower ones. Of this time the cultivator must judge from circumstances, previous observations, or the advice of some person accustomed to raising tobacco. All the plants should be topped at the same time, whatever may be their height, that they may ripen together, and produce leaves nearly of the same size and thickness. The suckers which shoot out from the footstalks of the leaves should also be broken or pinched off as fast as they appear.

The ripeness of tobacco is known by small dusky spots appearing on the leaves. The plants should then be cut near the roots, on the morning of a day of sunshine, and should lie singly to wither. When sufficiently withered, the plants should be laid in close heaps under cover to sweat, forty-eight hours or more. After this, they should be hung up under cover to dry. This may be done, by running two stalks on the sharp ends of a stick about eight inches long, and suspending them across a pole about sixteen inches apart, in a pretty tight apartment. As the plants become dry they may be placed nearer to each other, to make room for more, if necessary. When they have hung till there is no greenness in the leaves, and at a time when the air is damp, the leaves should be stripped off the stalks, tied up in hands, and packed away in chests or casks, well pressed down, and kept in a dry place, not in a cellar, which would soon spoil the tobacco.

The use of tobacco for chewing and snuffing is uncleanly, unwholesome, and becoming unfashionable with the more respectable parts of the community. The habit of chewing it, however, is not easily broken. A writer for the "National Intelligencer," with the signature "J. B.," states, in substance, that he was suffering under a pulmonary complaint, supposed to be brought on by chewing tobacco, and that by making a substitute of *slippery elm bark*, and swallowing the juice, he at once got rid of his disorder and his propensity to chew this poisonous plant. The dust or powder of tobacco, thrown over beds where plants are just coming up, preserves them from worms. It is said, also, that a few tobacco plants set out among cabbages and turnips, the tobacco plants about one rod apart, will save the cabbages and turnips from insects.

M. M'Louvin, in Loudon's Magazine, observes as follows: "I procure from the tobacconists a liquor expressed from tobacco, to every gallon of which I add five gallons of water; this mixture, with Read's garden syringe, I sprinkle over the trees, putting it on the finest rose, and being careful to wet all the leaves; this operation is performed only in the hottest sunshine, as the effect is then much greater than when the weather is dull. In this manner I have, with five gallons of liquor, reduced as above stated, cleaned seventeen peach and nectarine trees, twelve of which average seventeen feet in length and twelve in height. The black glutinous insect, provincially called blight, so destructive to the cherry trees, is destroyed in the same way, with equal facility I have also found that the grubs which attack the apricot may be destroyed almost instantly by immersing the leaves infested in this liquor.

"When trees have got so bad that their leaves are much curled, some of the flies, being protected within the curl, will escape: in this case more force must be applied to the syringe, and in a day or two the trees should be looked over again, and whatever part of the leaves has not been wetted should be washed with a painter's brush; but a careful person will render this process unnecessary by taking them in time."

Instead of liquor from the tobacconist, which may not always and in all situations be easily procured, a strong decoction of the stems or damaged leaves may be a cheap substitute. The uses of tobacco in destroying lice on cattle, ticks on sheep, &c. are too well known to render it necessary to make any observations on this application of a plant which seems to be abhorred by every animated being but man and the tobacco worm. But a quantity of tobacco ought to be grown by every cultivator, to enable him to wage successful war with insects.

PLOUGHING, is the most important of agricultural operations. On the manner in which this is performed depends all the subsequent operations of tillage on the same land. A large volume might well be written on this subject, but we shall confine ourselves to practical hints, expressed as concisely as is consistent with perspicuity.

In all stiff, heavy, and adhesive soils, that are much disposed to moisture, it should be a common rule not to plough them while wet in any considerable degree, especially if there is much clay in their composition. When such land is ploughed wet, the particles of which it is composed are apt to cake, or run together into hard lumps, which require much trouble and labor to reduce to a fine state. Besides, much injury is produced by the treading of the team, and greater power is necessary in performing the operation. But, on the other hand, such soils are ploughed with much difficulty when very dry; unless before the ploughing they were in a state of tillage, and not baked or bound down very hard. To break up grass ground composed of a strong loam, or a soil in which there is clay in any considerable quantity, when in a dry state, is next to impossible. You might almost as well attempt to plough up a brick pavement or slate rock. Green sward in general can hardly be ploughed too wet, if it be not miry. Marshy, moory, and peaty or mossy descriptions of soil should in general, when already reduced to a state of tillage, be ploughed when the season is dry.

In dry, sandy, and perhaps in some of the more mellow kinds of loamy soils, the business of ploughing may be performed when the earth is in a state of considerable moisture. But very dry sandy land, whenever the weather is hot and dry, should merely be stirred in such a way as may be necessary to prevent the growth of weeds; otherwise the great exhalation of moisture in such seasons may render them too dry for the vigorous vegetation of the seeds or plants which may be sown or growing upon them. The cultivators of this kind of soil have, therefore, many advantages over others who are engaged in the more stiff and heavy sorts of land, in being able to perform the various operations of arable husbandry with much less strength and expense of team, and by being much less interrupted by the wetness of the seasons. Stiff clayey soils, which are already under the plough, may be beneficially ploughed in dry weather, and it is said, that stirring such soils in a dry season causes them to imbibe moisture, but in sandy soils the opposite result is produced by the same means.

It is very fashionable, and, as a general rule, very correct to recommend deep ploughing. But this rule has a great many exceptions, and the cultivator who should be governed by it without regard to the nature of the soil and the proposed crops, would only labor hard to injure his land and reduce his products.

It may not be amiss to attend to what some writers have observed, respecting the dangers and disadvantages which attend ploughing deep without regard to the nature of the soil and other circumstances. It is observed in "Dickson's Agriculture," that "though deep ploughing has been recommended by some modern writers, upon particular kinds of land, where the bottom and top were of two opposite qualities, and neither of them perfectly good, that a mixture may sometimes be very beneficial, and the experiment of going below the common depth sometimes answer; but that when the top and bottom for eighteen or twenty inches depth consists of the same soil, it is not believed it is ever worth while to exchange the upper part, which has been enriched for centuries back, for a part less rich, merely because it is more fresh. On retentive soils, where the practice of loosening them to some depth by other implements is omitted, deep ploughing is however extremely necessary."

In an "Essay on the Best Means of Converting Grass Lands into Tillage, by James Roper Head, Esq.," published in "Communications to the Board of Agriculture," it is observed, that "it seems reasonable to prefer light to heavy ploughing; because, all things being equal, it must be preferable to have a small depth of soil to cultivate and improve; and inasmuch as the fibres of grass in general are fed from the upper surface of the earth alone, if they find sufficient pabulum, all that lie underneath their nourishment, and has been with much labor moved by the plough, is like a stock in trade, which requires an extra capital, unproductive of interest.

"I have endeavoured by all means to search into the nature of sainfoin, clover, and lucerne, and the result of my opinion has been, that the long penetrating tap-roots of these grasses pierce the earth in search of moisture only; that the tap-root is the mere syphon and duct; that the branches of the crown of the plant are fed alone by the upper surface of the soil; and that the luxuriancy of their produce depends, not upon the congeniality of the bed or *nidus* [nest] of the tap-root itself, but on the congeniality of the soil of the upper surface, which alone feeds and furnishes it vegetation."

An article in "Communications to the Board of Agriculture," written by John M. Mardo, Esq., contains the following statement: "We have witnessed instances where old pasture lands composed of a gravelly loam were broken up in the spring for barley by trench ploughing. The old sward was turned into the bottom of the furrow, and a dry subsoil brought to the surface from a considerable depth. The crops failed entirely, and there appeared two very obvious reasons for the failure; first, the subsoil brought to the surface to form the seed bed had long been deprived of the ordinary influence of the atmosphere and the rains; consequently must have been cold and infertile. Secondly, the dry tenacious sward having been placed half broken under the seed bed, the natural moisture of the ground, as well as that which falls in rain, was speedily and habitually evaporated. Unless in a season of uncommon moisture, a crop under such preparation could not prosper."

A writer in the "General Report of Scotland," Mr. James Brownhill, says "Old leas [grass grounds], in my opinion, should be ploughed if posible not above four and a half inches deep by eight and a half or nine inches broad. If the old lea be a dry soil, it will plough very well with those dimensions; if it be ploughed deeper it must also be ploughed broader, as the furrows will not ply close to one another, unless you have breadth in proportion to the depth."

Sir John Sinclair speaks highly of the advantages of deep ploughing, in some circumstances and for some crops, but says, "it is a general rule never to plough so deep as to penetrate below the soil that was formerly manured and cultivated, excepting upon fallow, and then only when you have plenty of lime or dung to add to and improve the new soil." The farmers of Flanders, which is said to be the best cultivated part of Europe, gradually deepen their soil by ploughing or digging up fresh earth as their manure increases. Mr. Authur Young likewise observes, that in poor hungry soils some proportion ought to be observed between the depth of a ploughing and the quantity of manure annually spread. The same writer informs us, that the depth of ploughing in various towns of England, on an average, in sandy soils, was four inches; in loamy soils four and three quarters, and in clayey soils three inches and a half.

Disputes have arisen among farmers in this country and in Europe relative to the best manner of laying the furrow slice. Some contend for turning the furrow slice completely over, and laying it quite flat; but others allege, that it is most advantageous to place each slice in such a manner that its outer edge may extend a little over the inner edge of the furrow which was drawn next before it. "In several districts in England it is usual to lay the furrow slice quite flat, and this is particularly the case where there are no ridges; but in Northumberland, and in Scotland, a contrary system is adopted. It is founded on this idea, that as two of the principal objects in ploughing are, to expose as much as possible to the influence of the atmosphere, and to lay the land, so that the harrows may, in the most effectual manner, raise mould to cover the seed; these objects are most effectually accomplished by ploughing land of every description with a furrow-slice about seven inches deep, and which, if about ten inches and a half broad, raises the furrow slice, with a proper shoulder, forming the angle forty-five, the point which ought to be referred to when determining between the merits of different specimens of ploughing. For that purpose, the depth of the furrow should, in general, bear a due proportion to the breadth, that is, about two-thirds, or as six inches deep is to nine broad. This is the general, if not the universal opinion of the Scotch Farmers."* The angle forty-five is strongly recommended in "Bayley's Essay on the Construction of the Plough," in his "Durham Report," and in "Brown's Treatise on Rural Affairs." In the southern counties of England, however, they generally prefer to turn the furrow quite flat, or horizontal; and allege, as a reason for that practice, that the weeds, grass, &c. ploughed under, cannot well be smothered or withered unless the roots are turned completely bottom upwards, and the turf covered so closely as to have no communication with the atmosphere.

In Flanders, land is frequently cultivated by an implement called the *binot*, which is highly esteemed. By this instrument the land is not turned over, as by the plough, and the weeds buried; but the soil is elevated and pressed into small ridges, and thus is better exposed to the beneficial influence of the winter frosts, and becomes much sooner dry in spring than when the land is turned over perfectly flat. When furrow slices are set up edgewise by a plough, they become small thin ridges, are more easily pervaded by frost, and are in a situation to attract more of the fertilizing influences of the atmosphere, than when they are turned over so as to lie in a horizontal position. Perhaps this mode of ploughing land may be advantageous in stiff, hard soils, where several ploughings are necessary to prepare for the reception of the seed. If land of this description is broken up in the fall or summer preceding the sowing or planting of the seed, and cross-ploughing in the spring is made use of, preparatory to putting in the seed, we are inclined to think that the "feather edged ploughing," as it is sometimes called, (in which the furrow slices are not laid so flat as to exclude the air from between and from the lower part of the furrow slices,) is to be preferred. "Ploughing previous to winter setting in is of great use to clays, or stiff lands, exposing the surface to the frost, which mellows and reduces it in a manner infinitely superior to what could be accomplished by all the operations of man."† If, then, exposing the surface of stiff soils to the frost is of great advantage, the more surface there is exposed the greater the advantage; and if the furrow slices

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[*] Code of Agriculture.

[†] See Husbandry of Scotland, Vol. I. p. 229, and Vol. XI, Appendix, p. 26.

are set partly or entirely on their edges there will be, as before intimated, more surface exposed than there would be if they were laid perfectly flat. And if they were turned in such a manner as to form an angle of forty-five degrees, the outer edge of the furrow resting on the inner edge of that which immediately preceded it, there would be but little chance for the weeds or grass to grow up between the furrows, which may be the case when the slices are set perpendicularly, or nearly so, on their edges. There will likewise always be a cavity under the edges of the furrow slices, containing stagnant and sometimes putrescent air, which will enrich the soil. Moreover, if ridge-ploughing is at all advantageous, we cannot see why a mode of ploughing which makes a ridge of every furrow slice; or at most a ridge by turning the edge of one furrow slice on the edge of its immediate predecessor, should not be likewise of advantage. Besides, by these modes of ploughing you form a covered or open drain or hollow place between the furrows, which, by carrying off superfluous water, will render the soil fit for tillage earlier in the spring than would be possible if every furrow slice was laid flat as it was turned upside down. The harrow will also more readily take hold of a soil where the furrow slices form little ridges or protuberances, and thus a proper mould will be procured for the covering of the seeds, or earthing up plants in a growing crop. And if there is danger of the lands lying too loose and hollow, repeated harrowing, and rolling it with a heavy roller after sowing, will furnish a remedy.

Dry sandy soils, such as ought *not* to be ploughed in ridges, should be turned over completely, and be laid and kept level as possible. Such soils, if rendered loose, and laid light by cultivation, will be robbed of their fertilizing particles as well by rain as by sunshine. In other words, they are liable to suffer by washing, by scorching, and by too much draining. They do not need to be made any lighter, by "feather-edged ploughing," or setting the furrow slices edgewise, being too light under ordinary cultivation. It is therefore "a great advantage to such soils to fold sheep, or to consume the crops of turnips upon the ground where they are raised. These practices greatly contribute to the improvement of such soils, not only by the dung and urine thus deposited, but by the *consolidation and firmness of texture* which the treading of sheep occasions."*

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* Code of Agriculture.

On the whole, although it would not be possible to give general rules not liable to many exceptions, on the shape and position of the furrow slice, which should be cut and disposed of according to the views of the cultivator, the nature of the ground, the proposed crop, &c., we are inclined to believe that Sir John Sinclair's maxim will apply to most of our New England uplands. That eminent agriculturist says, that "the point which ought to be referred to, when determining between the merits of different specimens of ploughing, is the angle of forty-five degrees." That is, other things being equal, the nearer the furrow slice comes to forming an angle of forty-five degrees with the horizon, the more perfect the specimen of ploughing. But another maxim of the same writer is equally worthy of attention. "Dry soils being deficient in moisture *ought to be tilled flat*, as any sort of drainings which the furrows might afford would be prejudicial rather than advantageous. In Kent, dry land is left as level as if it were dug with a spade. The moisture is thus equally diffused, and retained under the surface of the earth."

The following is extracted and abridged from an address delivered before the Middlesex Society of Husbandmen and Manufacturers; by Elias Phinney, Esq.

"In May, 1829, the field having lain three years to grass, and the crop of hay so light as to be worth not more than the expense of making, with a view of ascertaining the quantity of vegetable matter upon the surface, I took a single foot square of green sward, and after separating the roots and tops of the grasses from the loam and vegetable mould, it was found on weighing to contain nine ounces of clear vegetable substance; giving, at that rate, over twelve and a quarter tons to the acre. This convinced me of the importance of taking some course by which this valuable treasure might be turned to good account. That a great part of this mass of vegetable matter is exposed to useless waste, by the usual mode of ploughing, cross-ploughing, and harrowing, must be obvious to any one. In order therefore to secure this, as well as the light vegetable mould at and near the surface, which is liable to waste from the same causes, I had two acres of the green sward of this field turned over with the plough, as smoothly as possible. After removing the outside furrow slices into the centre of the plough land, and thereby effecting the double purpose of covering the vacant space in the middle and preventing ridges at the sides and ends, the field was rolled hard, with a loaded roller, by which the uneven parts of the furrows were pressed down and the whole made smooth. It was then harrowed lengthwise the furrows, with a horse harrow, but so lightly as not to disturb the sod. Twenty cart-loads of compost manure, made by mixing two parts of loam or peat mud with one of stable dung, were then spread upon each acre. It was then harrowed again, as before, and the poorer part of the soil, which had been turned up, and remained upon the surface, was thereby mixed with the compost manure. Corn was then planted in drills upon the furrow, the rows being at the usual distance and parallel with the furrows. At hoeing time, the surface was stirred by running a light plough between the rows, but not so deep at this or the subsequent hoeing as to disturb the sod. What Mr Lorrain calls the 'savage practice' of hilling up the corn was cautiously avoided. As the season advanced, I carefully watched the progress of my corn-field. In the early part of the season it did not exhibit a very promising appearance; but as soon as the roots had extended into the enriching matter beneath, and began to expand in the decomposing sward, which had now become mellow, and more minutely divided by the fermentation of the confined vegetable substances beneath than it possibly could have been by plough or hoe, the growth became vigorous, and the crop, in the opinion of those who examined the field, not less than seventy bushels of corn to the acre. As soon as the corn was harvested, the stubble was loosened up by running a light horse plough lengthwise through the rows, the surface then smoothed with a bush-harrow, and one bushel of rye, with a sufficient quantity of herd's grass and red top seed, to the acre was then sowed, the ground again harrowed and rolled. The crop of rye was harvested in July following, and the two acres yielded sixty-nine and a half bushels of excellent grain, and over five tons of straw. The grass sowed with the rye took well, and the present season I mowed, what those who secured the crop judged to be, two and a half tons of the very best of hay from each acre.

"Thus, with one ploughing, with the aid of twenty cart-loads of compost manure to the acre, I have obtained two crops of grain, and stocked the land down to grass."

HAY MAKING. It is a matter of much importance to the husbandman that he should take time by the foretop during the season for making hay. He must drive his business instead of being driven by it. Indolence or improper management in hay-time will soon give a sorry complexion to a farmer's affairs. A day or two lost or misemployed while the sun shines, and your grass suffers for lack of the scythe and the rake, or your grain is *going back* into the ground, while the sickle is rusting on a peg behind the door, and its owner is asleep or gone a journey, may be the means of introducing Mr. Deputy Sheriff on your premises, who may do more harm than a crop of thistles or a host of Hessian flies.

It is best, generally speaking, to cut your very heaviest grass first of all; and if it be lodged, or in danger of lodging, or the lower leaves and bottom of the stalks are beginning to turn yellow, although the grass is hardly headed, and appears not to have obtained more than two-thirds of its growth, you had better begin upon it. But when you have help enough, and your grass stands up well, you will do best to wait till the blossom is fully formed, and is beginning to turn brown. Clover is the most critical grass, and requires the most attention. "In all cases," says Sir John Sinclair, "clover ought to be mown *before the seed is formed*"[*] that the full juice and nourishment of the plants may be retained in the hay. By the adoption of this system the hay is cut in a better season, it can be more easily secured, and is much more valuable. Nor is the strength of the plant lodged in the seed, which is often lost.

"After being cut, the clover should remain in the swath till it is dried about two-thirds of its thickness. It is then not *tedded* or strewed, but turned over, either by the hands, or the heads of hay rakes. If turned over in the morning of a dry day, it may be cocked in the evening. The hay is as little shaken or scattered about afterwards as possible; and if the weather is good, after remaining two or three days in the cock, it may be carted into the stack."

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[*] It may not be amiss, however, to state, in this place, that agriculturists do not altogether agree on this point. In "Memoirs of the New York Board of Agriculture," (Vol. II. p. 90,) it is asserted, that "all the grasses are more nutritious if not mowed until the seed is fully grown. It should not be entirely ripened, however." The "Farmer's Assistant" tells us, that "the best time for cutting herd's grass [timothy], where but one crop is cut in the season, is when the seeds of the grass are fully formed, but before they have become fully ripe; but as farmers cannot all cut their hay in a day or two, it is necessary that they should begin before this time, that they may not end too long after it. The same time is also proper for cutting clover; or rather when a part of the heads begin to turn brown. Foul meadow or bird grass may be cut much later, without being hurt by long standing."

It is asserted by the "Farmer's Guide," that "grass will not thrive well that is not mown quite close; and the loss in the crop where this is not done is very considerable, *as one inch at the bottom weighs more than several at the top*."

The fore part of the season for making hay is, we believe, usually attended with less rain than the latter part. The days, too, are longer, and the dews are less copious. Farmers will, therefore, find additional motives from these circumstances to industry and exertion in early hay-time. Besides, if haying is protracted till harvest commences, the business of one season presses on that of another, and some crops will be nearly or quite spoiled in consequence of not being gathered in due time. The forehanded and industrious farmer thus possesses great advantages over one whom indolence or poverty induces to procrastinate the indispensable labors of his vocation.

Great advantages would result to the farmer, particularly in haying and harvesting, if he could form an estimate of the weather so as to be able to foresee with tolerable accuracy what would be its state for a few days, or even for twenty-four hours subsequent to the period of observation. Dr. Jenner's versified statement of "Signs of Rain," (published in the New England Farmer, Vol. II. p. 288,) may prove useful for this purpose, and the rhymes may assist the memory. A certain French philosopher, some years since, published an article, in which he asserted, in substance, that the web of a common spider is a sure index of the state of the air for twelve or fourteen days to come. If the weather is to be fair and calm, the principal thread will be spun to a great length; if, on the contrary, the weather is to be stormy and boisterous, the thread will be short and thick; and if the spider is seen to repair the damages its slender thread may sustain, you may anticipate pleasant weather for many days. So says the philosopher, but we cannot vouch for the accuracy of his saying. It may, however, not be amiss for the man of observation to pay some attention to this subject; for we know that the instinct of an insect is often more to be depended on than the researches of science.

In this climate, a southerly wind, if it continues stedfast for forty-eight hours is generally followed by rain. If the wind, however shifts its course with the sun, or, as sailors phrase it, goes round with the sun, in the morning blowing from the south, or east of south, and changing westerly as the sun advances, it generally indicates dry weather. If the wind shifts in a course opposite to the apparent course of the sun, rain commonly succeeds. If the wind continues southerly, and blows briskly through the night, it commonly, as the phrase is, "blows up rain." This effect of a south wind in this country may be thus accounted for. A southerly wind is a current of air which has its origin in warmer latitudes than those in which we are situated. This current in passing over the ocean imbibes or takes up as much water as air of its temperature can hold in solution. Passing into higher or colder latitudes the air of the current parts with a portion of its heat or caloric, and cannot retain so much water as it held in its outset. Clouds or vapors are therefore formed, and the excess of moisture is deposited in mist, rain, hail, or snow, according to circumstances, the season, &c. On the contrary, a northerly wind, coming from a comparatively cold latitude, acquires caloric as it advances, and with that acquisition its capacity for holding water in solution is increased. Therefore a northerly wind is a *drying* wind, and its predominance soon dissipates clouds and introduces fair weather.

But to come down from the clouds to matters more within the reach of the reader. It has been often recommended by writers on agriculture to cart hay, particularly clover, before the stalks are dry; and either to put it up with alternate layers of straw, or to salt it at the rate of from half to one bushel of salt to the ton.

"Salt hay in this country has usually been hurt by lying too long in the swaths. The method in which I have treated it for several years, is, to cock it the next day after it is cut, and carry it in, without delaying more than one day, and put a layer of some kind of dry straw between load and load of it in the mow, to prevent its taking damage by over-heating. The straw contracts so much of its moisture and saltness, that the cattle will eat it very freely; and the hay is far better than that made in the common way."*

The making of herbage plants [such as clover, lucerne, sainfoin burnet, &c.] into hay, is a process somewhat different from that of making hay from natural grasses. As soon as the swath is thoroughly dry above, it is gently turned over (not tedded nor scattered) without breaking it Sometimes this is done by the hand, or by a small fork; and some farmers are so anxious to prevent the swath from being broken, that they will not permit the use of the rake shaft. Another writer observes, that the practice of the best English, Flemish, and French farmers, is to expose the hay as little as possible to the sun. It is carried in dry, but preserves its green color; and we see hay of one or two years old in their market, of so bright a green color that we could scarcely conceive it to be cured. Yet they are in the practice of preserving it for years, and value it more for its age. If such a course be best in climates so cool and cloudy, how much more important would it be under our scorching summer suns.

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* Deane's New England Farmer

"But if the weather be unsettled, or if showers be frequent, it may be better to *spread grass well* as soon as it is mowed, stir it often, cock it the same day it is moved; open it the next fair day, when the dew is off; let it sweat a little in the cock, and house it as soon as it is dry enough. It will bear to be laid greener on a scaffold than in a ground mow; and in a narrow mow greener than in a broad one; and that which is least of all made should be put upon the scaffold." — *Deane.*

Sir John Sinclair is very explicit on the subject of "making clover into hay." "The process," he observes, "is quite different from the plan of making hay from natural grasses." Mr. Lorrain gives us both sides of this question. He says, "I did not like to abandon the practice of curing hay in the swath, having observed that it saved labor. The grasses are at all times very expeditiously turned in the swath. If continued rains occur, the swaths are not only quickly turned, but if the sun shines powerfully between the showers, the inside of them is not parched by its rays. By turning the swaths throughout long-continued rain, as often as the under side of them was likely to be injured by fermentation, I have saved extensive fields of hay; while my neighbours, who gave no attention to this interesting subject, had their crops entirely ruined. If the grasses, however, be raked up into small winrows, they are as readily turned, and may be as effectually preserved as if they remained in swaths, but in this case the labor is greater."

The same writer, however, in the next paragraph, takes other ground. "Curing hay," he observes, "in swath, to save the juices, seems to be not only practically wrong, but also opposed to reason. The confined heat and moisture in the interior of the swath promote fermentation, and must be more or less injurious to the nutritive matter contained in the grasses. It is exactly calculated to weaken the grasp of the leaves, and to separate them from the stalk. It also greatly weakens their general texture, and causes them to crumble into pieces when they become dry. While this is doing, the outside surface of the swath is scorched by the rays of the sun, and becomes but little better than straw, before the inside is moderately cured. In raking, cocking, heaping, and inning, the swaths are so far separated, that many of the leaves are lost before the hay gets into the mow; but few of them get into the rack."

We have thus given both sides of the controverted question in agriculture, and our readers will take that which appears to them most tenable. We confess ourselves rather inclined to embrace the opinions of a correspondent who says, "If it be correct to 'make hay while the sun shines,' it may be well to make it as quickly as possible; but in this, as in many other processes, circumstances alter cases."

HARVESTING. It is asserted, as a general rule, that the proper time to reap wheat or rye is when the straw begins to shrink and become white about half an inch below the ear. This appearance is a sure indication that the grain has ceased to receive nourishment from the roots of the plant; and by cutting early, provided it is not taken to the barn or stack too green, the following advantages will be gained: 1st. The grain will make more and whiter flour. 2d. There will be less wasted by the grain's shelling. 3d. By commencing harvest early, you will have a fairer prospect of finishing before the last cuttings become too ripe, so that much of the grain will shell out in reaping and securing the crop. 4th. If you cut your grain as soon as it will answer, your straw and chaff will contain much more nourishment than if it were bleached and made brittle by the sun, air, dew, and rain, all of which combine to deprive it of most of its value for fodder. 5th. Should you plough in your stubble immediately after harvest, or mow it and secure it for fodder or litter, (either of which modes of management is perfectly consonant with the rules of good husbandry,) the stubble will make much better food for your cattle or manure for your ground, than if it had yielded all its sweets and much of its substance to the greedy elements above mentioned.

If your wheat or rye is much affected by blight or rust, it should be cut even while still in the milk, and afterwards exposed to the sun and air, till the straw is sufficiently dry and the grain so much hardened that it will answer to deposit in the barn or stack. The heads, in such cases, should be so placed by the reapers as not to touch the ground. This may be done by laying the top ends of each handful on the lower end of the preceding one.

If your grain is encumbered with grass or weeds, you must cut it pretty near the top, in order to avoid as much as possible those extraneous substances. It will also be necessary to reap somewhat earlier than might be otherwise expedient, that you may have time to dry the weeds without danger of the grain's shelling out. If your grain is very ripe when you harvest it, the bands should be made early in the morning while the straw is moist and pliable. And Dr. Deane recommends, in such cases, to bind the sheaves when the air begins to be damp towards evening, as the least degree of moisture will toughen the straw.

It has been recommended by several English writers to bind wheat as well as rye with only one length of the straw. If the straw is pretty long, and not very thoroughly dry, this may be good economy. You save the trouble of making bands ; your wheat will dry better in the sheaf ; (as the sheaves must of course be small ;) and though it may take some more time and trouble to pitch and handle it, we believe the advantages, in many cases, will turn the scale in favor of binding wheat with single lengths of straw.

In stowing wheat or rye, some persons deposit the sheaves on a mow of hay ; but this is a bad plan, as the grain presses the hay so that it is apt to become musty, and communicate a musty or mouldy taint to the superincumbent grain ; which will be harder to thresh than if it had a more dry and airy location. It may be placed on a scaffold of rails, laid on the beams, and over the floor of a barn ; though it is not so easy to procure it for threshing as if it were laid on a scaffold of less elevation. But this disadvantage may be more than compensated by its being in a situation favorable for drying. If there is a deficiency of barn room, the sheaves may be stored in stacks. In that case, "care should be taken that the grain may not draw moisture from the ground, by laying boards, straw, or rubbish under the stack A better way still, is to have a tight floor of boards mounted on four blocks, set in the ground, and so high from the ground as to prevent the entering of vermin.

"In building a stack, care should be taken to keep the seed ends of the sheaves in the middle, and a little higher than the outer ends. No fowls can then come at the grain; and the rain that falls on the outer ends will run off, and not pass towards the centre. The stack should be well topped with straw, that the rain may be completely turned off."

Oats. It is advised to harvest oats before the straw has wholly turned yellow. The straw will be of little value, if permitted to stand till it becomes white and destitute of sap. Though oats should be well dried on the ground, after cutting, they should not be raked nor handled when they are in the driest state. They should be gathered mornings and evenings, when the straw is made limber and pliable by the moisture of the air. If they are housed while a little damp, there will be no danger, if they have been previously thoroughly dried.

Barley. We are told by the wise men of agriculture, that some of the rules which should be observed in harvesting wheat, rye, and oats, will not apply to barley. Willich's "Domestic Encyclopedia" states, that, "with respect to the time when barley is fit to be mowed, farmers frequently fall into the error of cutting it before it is perfectly ripe; thinking it will attain to perfect maturity if it lie in the swath. This, however, is a very common error, as it will shrivel in the field, and afterwards make but an indifferent malt; it also threshes with more difficulty, and is apt to be bruised under the flail. The only certain test of judging when it is fit to mow must be from the dropping and falling of the ears, so as to double against the straw. In that state, and not before, it may be cut with all expedition and carried in without danger to the mow.

Dr. Deane's "New England Farmer" states, that "some have got an opinion that barley should be harvested before it is quite ripe. Though the flour may be a little whiter, the grain shrinks so much that the crop seems greatly diminished and wasted by early cutting. No grain, I think, requires more ripening than this; and it is not apt to scatter out when it is very ripe. It should be threshed soon after harvesting; and much beating, after it is cleared from the straw, is necessary in order to get off the beards Let it lie a night or two in the dew, after it is cut, and the beards will come off the more easily.

DRAINS used in farming are of two kinds, open and covered. Drains should be of a size and depth proportioned to the extent of the swamp and the probable quantity of water for which they are designed to be channels. They should generally be carried through the lowest and wettest part of the soil, although it should be necessary, in order to effect that purpose, to deviate from straight lines Open drains sometimes answer the double purpose of conveying off superfluous water and of inclosing fields; but they make a hazardous and inconvenient fence without the addition of a bank, hedge, or railing. The "Farmer's Assistant" says, "When a ditch is made for a fence, it ought to be four feet wide at the top, one or less at the bottom, and about two and a half deep; with the earth all thrown out on one side, and banked up as high as possible." Sir John Sinclair states, that "it is a general rule regarding open drains, with a view of giving sufficient slope and stability to their sides, that the width at top should be three times as much as that which is necessary at the bottom, and in the case of peat-mosses or soft soils, it should be such as to allow the water to run off without stagnation, but not with so rapid a motion as to injure the bottom."

But before you attempt to drain a piece of land, it will be well not only to calculate the cost, but to ascertain the nature of the soil which it is proposed to render fit for cultivation. If the subsoil or under layer be clay, the swamp may be worth draining, though there should be no more than six inches of black soil or mud over it, for the clay and the mud mixed will make a fertile soil. But if the subsoil or under stratum be gravel or white sand, it will not, in common cases, be best to undertake draining, unless the depth of black mud be as much as from fifteen or eighteen inches deep; for the soil will settle after draining, and be less deep than it was before. But the situation of the land to be drained may authorize some variation from these general rules.

The manner of draining a swamp is as follows. Beginning at the outlet, pass a large ditch through it, so as mostly to cut the lowest parts. Then make another ditch quite round it, near to the border, to cut off the springs which come from the upland, and to receive the water that runs down from the hills upon the surface in great rains. These ditches should be larger or smaller, in some proportion to the size of the swamp, the shape and size of the hills which surround it, and other circumstances, which might tend to greater or less quantities of water being occasionally or generally led to the ditches. If the swamp be large, it may be necessary that some smaller cross drains should be cut in several of the lowest parts. The bottom of the main ditches, when the soil is not of an extraordinary depth, must be lower than the bottom of the loose soil ; otherwise the soil will never become sufficiently dry and firm.*

It is said, by Sir John Sinclair, (Code of Agriculture, p. 182,) that, "in all drains, it is a rule to begin at the lowest place and to work upwards, by which the water will always pass from the workmen and point out the level. This enables the laborers also to work in coarse weather, and prevents their being interrupted by wet so early in the season as otherwise might happen."

The mud and other materials which are dug out of a ditch or drain should not be suffered to lie in heaps or banks by the side of the ditch, but should be spread as equally as possible over the surface of the drained land. In this way, the matter taken from the ditches will tend to level the surface of the swamp, will, perhaps, serve in some measure for manure, and will not present any impediment to the passage of the water to the ditches. In some cases it may be advisable to transport the earth which is taken from the ditches to the farm-yard or the hogpen, to form a part of that layer which good farmers generally spread over those places in autumn, to imbibe liquid manure, or make into compost with dung. In many instances, we are told, that the earth thus dug out of ditches is thought to be worth enough to pay for the expense of digging the ditches.

Mr. Henry W. Delavan, in a communication on the subject of *Underdraining*, in "The New England Farmer." (Vol. X. p. 97,) says : —

"Without this salutary and simple operation, no inconsiderable proportion of many valuable districts of our country must continue little better than waste. It is generally total loss of labor to the farmer who attempts to cultivate wet lands in our rigorous climate, and by draining, these useless inhospitable acres have been found of the kindliest and most productive character.

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* See Deane's New England Farmer, article Drains.

"Having a surplus of stones on my estate beyond what fences require, I use the smaller and ill-formed for drains; they have the advantage of brush in durability and of tiles in economy. My drains are, for the most part, three feet in depth, two feet in width at top, sloping to one at bottom. The bottom stones are largest, and are carefully placed to allow the water to flow freely beneath, while above the small stones are thrown in at random, so that when levelled they are beneath the plough. Over these swingle-tow, shavings, or straw, may be thrown, after which the earth can be replaced by the spade or plough, so as to present a rather higher surface than the grounds adjacent, and the business is accomplished. It is very essential that the descent be easy, neither too quick nor too slow, and that all *surface water* be excluded, as it would speedily choke and destroy the underdraining. I estimate the average cost of such drains at sixty-two and a half cents the rod. It should be remarked, that underdraining is adapted to lands presenting sufficient declivity to carry off the springs, and it is only the under water that is meant to be drained in this manner, while open ditches are adapted to the bottom lands for the conveyance of surface water. I will state what appears to me the prominent advantages that the cultivator may promise himself by a thorough system of draining.

"In the first place, he creates, as it were, so much additional terra firma, and adds essentially to the health of all around him, by correcting the ill tendencies of excessive moisture. He can cultivate reclaimed lands several weeks earlier and as much later in each year than those that are unreclaimed, and his crops are better and more sure. The labor of after tillage is much diminished. The stones that impede the plough and scythe are removed; and not the least essential benefit is the *constant supplies of water* which may be insured in any field inclining to moisture, which, with reference to animals, will, as a permanent convenience and advantage, fully compensate the expense of drains."

PASTURE. "To manage pasture land advantageously, it should be well fenced in small lots, of four, eight, or twelve acres, according to the largeness of one's farm and stock, and these lots should be bordered at least with rows of trees. It is best that trees of some kind or other should be growing scattered in every point of a pasture, so that the cattle may never have to go far in a hot hour to obtain a comfortable shade. The grass will spring earlier in lots that are thus sheltered, and they will bear drought the better. But too great a proportion of shade should be avoided, as it will give a sourness to the grass.

"Small lots thus sheltered are not left bare of snow so early in the spring as larger ones lying bare, as fences and trees cause more of it to remain upon the ground. The cold winds in March and April hurt the grass much when the ground is bare. And the winds in winter will not suffer snow to lie deep on land that is too open to the rake of winds and storms.

"It is hurtful to pastures to turn in cattle too early in the spring; and most hurtful to those pastures in which the grass springs earliest, as in very low and wet pastures. Potching such land in the spring destroys the sward, so that it will produce the less quantity of grass. Neither should cattle be let into any pasture until the grass is so much grown as to afford them a good bite, so that they may fill themselves without rambling over the whole lot. The 20th of May is early enough to turn cattle into almost any of our pastures. Out of some they should be kept later. The driest pastures should be used first, though in them the grass is shortest, that the potching of the ground in the wettest may be prevented.

"The bushes and shrubs that rise in pastures should be cut in the most likely times to destroy them. Thistles and other bad weeds should be cut down before their seeds have ripened; and ant-hills should be destroyed. Much may be done towards subduing a bushy pasture by keeping cattle hungry in it. A continual browsing keeps down the young shoots, and totally kills many of the bushes. Steers and heifers may mend such a pasture, and continue growing.

"But as to cleared pastures, it is not right to turn in all sorts of cattle promiscuously. Milch kine, working oxen, and fatting beasts, should have the first feeding of an inclosure; afterwards, sheep and horses. When the first lot is thus fed off, it should be shut up, and the dung that has been dropped should be beat to pieces, and well scattered. Afterwards the second pasture should be treated in the same manner, and the rest in course, feeding the wettest pasture after the driest, that the soil may be less potched.

"Something considerable is saved by letting all sorts of grazing animals take their turn in a pasture. By means of this, nearly all the herbage produced will be eaten; much of which would otherwise be lost. Horses will eat the leavings of horned cattle; and sheep will eat some things that both the one and the other leave.

"But if in a course of pasturing, by means of a fruitful year or a scanty stock of cattle, some grass of a good kind should run up to seed and not be eaten, it need not be regretted; for a new supply of seed will fill the ground with new roots, which are better than old ones. And I know of no grass that never needs renewing from the seed.

"A farmer needs not to be told, that if he turn swine into a pasture, they should have rings in their noses, unless brakes and other weeds need to be rooted out. Swine may do service in this way. They should never have the first of the feed; for they will foul the grass, and make it distasteful to horses and cattle.

"Let the stock of a farmer be greater or less, he should have at least four inclosures of pasture land. One inclosure may be fed two weeks, and then shut up to grow; then another. Each one will recruit well in six weeks; and each will have this space of time to recruit. But in the latter part of October, the cattle may range through all the lots, unless some one may become too wet and soft. In this case, it ought to be shut up, and kept so till feeding time the next year.

"But that farmers may not be troubled with low miry pastures, they should drain them, if it be practicable, or can be done consistently with their other business. If they should produce a smaller quantity of grass afterwards, it will be sweeter, and of more value. It is well known, that cattle fatted in a dry pasture have better tasted flesh than those which are fatted in a wet one. In the old countries it will fetch a higher price. This is particularly the case as to mutton.

"Feeding pastures in rotation is of greater advantage than some are apt to imagine. One acre, managed according to the above directions, will turn to better account, as some say who have practised it, than three acres in the common way. By the common way I would be understood to mean, having weak and tottering fences, that will drop of themselves in a few months, and never can resist he violence of disorderly cattle ; suffering weeds and bushes to overrun the land ; keeping all the pasture land in one inclosure ; turning in all sorts of stock together ; suffering the fence to drop down in autumn, so as to lay the pasture common to all the swine and cattle that please to enter ; and not putting up the fence again till the 1st of May, or later. Such management is too common in all the parts of this country.

"Land which is constantly used as pasture will be enriched. Therefore it is advisable to mow a pasture lot once in three of four years, if the surface be so level as to admit of it. In the mean time, to make amends for the loss of pasture, a mowing lot may be pastured. It will thus be improved : and if the grass do not grow so rank afterwards in the pasture lot, it will be more clear of weeds, and bear better grass. Alternate pasturing and mowing has the advantage of saving a good deal of expense and trouble in manuring the mowing grounds.

"Though pastures need manuring less than other lands, yet, when bushes, bad weeds, &c. are burnt upon them, the ashes should be spread thinly over the surface. The grass will thus be improved : and grass seeds should be sown upon the burnt spots, that no part may be vacant of grass.

"Sheep, calves, and horses, unless they are worked, it is said, require no water in their pastures. The want of water induces them to feed in the night, when the dew is on and the grass the more nutritious. Cows however want pure water.

"In pastures which are on side-hills, water may generally be obtained by digging horizontally into the side of the hill, till it is found, and then carrying it out with a pipe." — *Deane.*

"Three modes have been adopted in Great Britain for consuming clover and other herbage plants by pasturing These are tethering, or fastening the feeding animal to a stake, hurdling, and free pasturage. In the 'Agricultural Report of Aberdeenshire,' it is stated, that there are some cases in which the plan of tethering can be practised with more profit than even soiling. In the neighbourhood of Peterhead, for instance, they tether milch cows on their grass fields, in a regular and systematic method, moving each tether forward in a straight line, not above one foot at a time, so as to prevent the cows from treading on the grass that is to be eaten ; care being always taken to move the tether forward, like a person cutting clover with a scythe from one end of the field to the other. In this way, a greater number of cows can be kept on the same quantity of grass than by any other plan, except where it grows high enough to be cut and given them green in houses. In one instance, the system was carried to great perfection by a gentleman who kept a few sheep upon longer tethers, following the cows. Sometimes also he tethered horses afterwards upon the same field, which prevented any possible waste, for the tufts of grass produced by the dung of one species of animal will be eaten by those of another kind without reluctance This mode was peculiarly calculated for the cow-feeders in Peterhead; as, from the smallness of their holdings, they could not keep servants to cut or horses to carry home the grass to their houses, to be consumed in a green state.

"In hurdling off clover or herbage crops, a portion of the field is inclosed by hurdles, [movable wooden fences,] in which sheep are confined, and as the crop is consumed the pen is changed to a fresh place, until the whole is fed off This practice is very extensively adopted at Holkham [Eng.,] and is peculiarly calculated for light and dry soils. Its advantages are, that the grass is more economically consumed; that the stock thrives better, having daily a fresh bite; and that the dung which falls, being more concentrated, is more likely to be of use." — *Loudon.*

Water should be provided for every field under pasture; and also shelter and shade, either by a few trees, or by a portable shed, which may be moved with the stock from one inclosure to another. Where there are no trees, rubbing posts are also a desirable addition. In Germany they have portable sheds which are employed both in summer and winter, and generally with a piece of rock-salt fixed to a post for the cattle to lick at will.

Some graziers mix a few sheep and one or two colts in each pasture, which both turn to account, and do little injury to the grazing cattle. In some cases, we are told that sheep are beneficial to pastures, by eating down and destroying white weed, and some other useless and pernicious plants.

So various is the appetite of animals, that there is scarcely any plant which is not chosen by some and left untouched by others. The following is said to be a fact, known and practised on by graziers in Holland. When eight cows have been in a pasture, and can no longer obtain nourishment, two horses will do very well there for some days, and when nothing is left for the horses, four sheep will live upon it; this not only proceeds from their differing in the choice of plants, but from the formation of their mouths, which are not equally adapted to lay hold of the grass.

Stocking a pasture with as many sheep as it will support is recommended for forming a tender herbage, and causing the grass to mat or grow very thick at the bottom.

An English writer says, "in turning out horses to grass in the spring, it is usual to choose the forenoon of a fine day to do it in; the natural consequence is, the horse fills his belly during the sunshine, and lays down to rest during the cold of the night, thereby probably exposing himself to disorders. In some parts of Yorkshire a better practice prevails: the horse is turned out at bed-time; the consequence is, he eats all night, and sleeps in the sunshine of the next day"

POULTRY. In order to have fine fowls, it is necessary to choose a good breed, and have a proper care taken of them. The Canton breed is thought highly of; and it is certainly desirable to have a fine large kind, but people differ in their opinion which is best. It is as important to cross the breeds of fowls as of other animals; hence it is improper to save males and females from the same sittings of eggs, if they are to be kept for propagation. The black is very juicy; but do not answer so well for boiling, as their legs partake of their color. They should be fed as nearly as possible at the same hour and place. Potatoes boiled, unskinned, in a little water, and then cut, and either wet with skimmed milk or not, form one of the best foods. Turkeys and fowls thrive amazingly on them. The milk must not be sour.

The best age for setting a hen is from two to five years; and you should remark which hens make the best brooders, and keep those to laying who are giddy and careless of their young. In justice to the animal creation, however, it must be observed, there are but few instances of bad parents for the time their nursing is necessary.

Hens sit twenty days. Convenient places should be provided for their laying, as these will be proper for sitting likewise. If the hen-house is not secured from vermin, the eggs will be sucked and the fowls destroyed

Those hens are usually preferred which have tufts of feathers on their heads ; those that crow are not looked upon as profitable. Some fine young fowls should be reared every year, to keep up a stock of good breeders ; and by this attention, and removing bad layers and careless nurses, you will have a chance of a good stock.

Let the hens lay some time before you set them, which should be done from the end of February to the beginning of May. While hens are laying, feed them well, and sometimes with oats.

Broods of chickens are hatched all through the summer, but those that come out very late require much care till they have gained some strength.

If the eggs of any sort are put under a hen with some of her own, observe to add her own as many days after the others as there is difference in the length of their sitting. A turkey and duck sit thirty days. Choose large clear eggs to put her upon, and such a number as she can properly cover. If very large eggs, there are sometimes two yolks, and of course neither will be productive. Ten or twelve are quite enough.

A hen-house should be large and high ; and should be frequently cleaned out, or the vermin of fowls will increase greatly. But hens must not be disturbed while sitting ; for if frightened, they sometimes forsake their nests. Wormwood and rue should be planted plentifully about their houses ; boil some of the former, and sprinkle it about the floor, which should be of smooth earth not paved. The windows of the house should be open to the rising sun, and a hole must be left at the door, to let the smaller fowls go in ; the larger may be let in and out by opening the door. There should be a small sliding board to shut down when the fowls are gone to roost, which would prevent the small beasts of prey from committing ravages ; and a good strong door and lock may possibly, in some measure, prevent the depredations of human enemies.

When some of the chickens are hatched long before the others, it may be necessary to keep them in a basket of wool till the others come forth. The day after they are hatched, give them some crumbs of white bread, and small (or rather cracked) grits soaked in milk. As soon as they have gained a little strength feed them with curd, cheese parings cut small, boiled corn, or any soft food, but nothing sour ; and give them clean water twice a day. Keep the hen under a pen till the young have strength to follow her about, which will be in two or three weeks, and be sure to feed her well.

The food of fowls goes first into their crop, which softens it; and then passes into the gizzard, which by constant friction macerates it; and this is facilitated by small stones, which are generally found there, and which help to digest the food.

The pip in fowls is occasioned by drinking dirty water, or taking filthy food. A white thin scale on the tongue is the symptom. Pull the scale off with your nail, and rub the tongue with some salt; and the complaint will be removed.

It answers well to pay some boy employed in the farm or stable so much a hundred for the eggs he brings in. It will be his interest then to save them from being purloined, which nobody but one in his situation can prevent; and six or eight cents a hundred will be buying eggs cheap.

To fatten Fowls or Chickens in four or five Days. Set rice over the fire with skimmed milk, only as much as will serve one day. Let it boil till the rice is quite swelled out: you may add a tea-spoonful or two of sugar, but it will do well without. Feed them three times a day, in common pans, giving them only as much as will quite fill them at once. When you put fresh, let the pans be set in water, that no sourness may be conveyed to the fowls, as that prevents them from fattening. Give them clean water, or the milk of rice, to drink; but the less wet the latter is when perfectly soaked the better. By this method the flesh will have a clear whiteness which no other food gives; and when it is considered how far a pound of rice will go, and how much time is saved by this mode, it will be found to be cheap. The pen should be daily cleaned, and no food given for sixteen hours before poultry be killed. A proportion of *animal* mixed with vegetable food is said to cause poultry to thrive rapidly, but they should be confined to a vegetable diet for a fortnight or three weeks before they are killed for eating. A quantity of charcoal, broken in small pieces and placed within the reach of poultry, is said to increase their appetite, promote their digestion, and expedite their fattening.

To choose Eggs at Market and preserve them. Put the large end of the egg to your tongue; if it feels warm it is new. In new-laid eggs there is a small division of the skin from the shell, which is filled with air, and is perceptible to the eye at the end. On looking through them, against the sun or a candle, if fresh, eggs will be pretty clear. If they shake they are not fresh.

Eggs may be bought cheapest when the hens first begin to lay in the spring, before they sit ; in fall and winter they become dear. They may be preserved fresh by dipping them in boiling water and instantly taking them out, or by oiling the shell ; either of which ways is to prevent the air passing through it ; or kept on shelves, with small holes to receive one in each, and be turned every other day ; or close packed in the keg, and covered with strong lime-water.*

BIRDS. The following remarks on shooting birds, &c., are from a communication, published in the "New England Farmer," Vol. IX., p. 338 ; —

"It is a well-known fact, that the alarming increase of worms and insects in making ravages upon our fruit-trees and fruit, not only paralyzes the efforts and disheartens the hopes of the cultivator, but threatens total destruction to many of the most delicious kinds. So extensive are their ravages that but very few of our apricots and plums ever ripen without premature decay from the worm generated by the beetles which surround our trees in the twilight of the evening in great numbers when the fruit is quite young. And when the produce of our apple, pear, or peach trees is small, but few of these escape the same fate.

"I attribute the rapid and alarming *increase* of these worms and insects *wholly* to the diminution of those birds which fall a prey to our sportsmen, which are known to feed upon them, and for whose subsistence these insects were apparently created.

"In addition to the important usefulness of these birds, their musical notes in the twilight of the morning are peculiarly delightful ; awaking the cultivator to the sublime contemplation and enjoyment of all the infinite beauties of creation.

"In vain will be all our toil and labor, in vain the united efforts of horticultural societies for increasing and perfecting the cultivation of the most delicious varieties of fruits, unless we can *increase*, or at least *cease* to *diminish* these useful and melodious birds.

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* For Treatises on Poultry and their different varieties, see Fessenden's Mowbray, published by Lilly and Wait, and New England Farmer, Vol. IX. p. 254, 273, 293, 318, 341.

"If we have a statute in this commonwealth providing for the protection of these birds, let us unite our efforts to arrest this wanton destruction of them *by enforcing the penalties of the law in every instance of its violation.* Our Horticultural Society can scarcely do a greater service in promoting the objects of its organization, than by making a spontaneous and vigorous effort to this effect.

"If there be no statute for the protection of these invaluable creatures, I would earnestly, yet respectfully, suggest to the Horticultural Society the propriety and even necessity of their petitioning our legislature at their next session for such an act.

"It is a common practice with these sportsmen through the summer to range the groves and orchards in this vicinity, almost every pleasant day, and more numerously on holidays, and to shoot *every bird* that comes within their reach.

"It is not however a small nor an easy task for one individual to get their names, residence, and the evidence necessary for their conviction; but it requires the united efforts of all who are immediately interested. Already have these sportsmen commenced their wanton destruction of these useful creatures, even before they had time to build a nest for the rearing of their young. Birds that have survived the dreary winter in a more genial clime, having now returned to bless our efforts by their industry and to cheer our days with their melody, are scarcely permitted to commence their vernal song, ere they must fall victims to a WANTON IDLENESS that is as destitute of moral feeling as of useful employment."

The following was originally published in the Boston Patriot; —

"*On Birds and their Misfortunes.* We have already intimated our opinion, that the labors of the scientific ornithologist are of far more practical utility than the casual observer might suppose; and that, even in the business of legislation, a regard to his researches might prevent many errors, which may much affect public welfare. The legislation on the subject of birds has been marked by some essential errors, which have led to real evil. By the law of 1817, woodcocks, snipes, larks, and robbins, were protected at certain seasons of the year, whilst war to the knife was declared against crows, blackbirds, owls, blue-jays, and hawks; these last were treated as a sort of pirates, subject to suspension at the yard-arm with the least possible ceremony. It so happens, that the character of these very birds has been singularly mistaken; for while the ordnance of legislation has been thus systematically levelled at them, they, on a principle which man would do extremely well to imitate, have been returning good for evil; they have been diligently engaged in extirpating all sorts of vermin, while never were the vilest vermin half so ill-treated by the human race. The crow, for example, who is generally regarded as a most suspicious character, has had great injustice done him. In the spring, when the ground is moist, he lives in a state of the most triumphant luxury on grubs; he eats the young corn, it is true, but it is a necessary of life to which he never resorts except when his supply of animal food is shortened. After the corn is tolerably grown, he has nothing more to do with it; and in any stage he destroys at least five hundred pernicious grubs and insects for every blade of corn which he pillages from man. In the southern states, he is regularly permitted to accompany the ploughman, and collects the grubs from the newly-opened furrow; his life is thus secured by the safest of all tenures, that of the interest of man in permitting him to live.

"There is scarcely a farm in England without its rookery; the humid atmosphere multiplies every species of insect, and those birds reward man for his forbearance by ridding him of legions of his foes. By a policy like that which dictated the revocation of the edict of Nantes, they have occasionally been exposed to the mischievous propensities of unruly boys, who, as far as utility is concerned, are not to be compared to crows; but the error of this step soon became obvious, and they are now received with a universal welcome. The hawk enjoys a doubtful reputation in the hen-roost; he sometimes destroys the chickens, but with the consistency of man does not like to see his infirmities copied by another; and by way of compensation demolishes the fox, which eats twenty chickens were he eats but one; so that it is hardly the part of wisdom to set a price upon his head, while the fox, a hardened knave, is not honored with a penal statute. How the owl came to be included in this black list, it is difficult to conjecture; he is a grave, reflecting bird, who has nothing to do with man, except to benefit him by eating weasels, foxes, raccoons, rats, and mice, a sin for which most housekeepers will readily forgive him. In some parts of Europe he is kept in families, like the cat, whom he equals in patience and surpasses in alertness. Another of these birds, the blackbird, is the avowed enemy of grubs, like the crow; in the middle states, the farmer knows the value of his company to pluck them from the furrow; and while other less pains-taking birds collect the vermin from the surface, his investigations are more profound, and he digs to the depth of several inches in order to discover them. When the insects are no longer to be found, he eats the corn, as well he may, but even then asks but a moderate compensation for his former services. Five hundred blackbirds do less injury to the corn than a single squirrel. The last upon the catalogue of persecuted birds is the blue-jay. Whoever watches him in the garden will see him descend incessantly from the branches, pouncing every time upon the grub, his enemy and ours.

"We have already seen, that the act to which we have referred protects some birds at certain seasons of the year; among others, the robin, who lives on insects and worms, and has no taste for vegetable diet, and the lark, who is extremely useful in his way. The only wonder is, that it should have been thought expedient to allow them to be shot in any season. The quail, another of the privileged class, has no title to be named in company with the others; in the planting time, he makes more havoc than a regiment of crows, without atoning for his misdeeds by demolishing a single grub. Nor is the partridge a much more scrupulous respecter of the rights of property; though, as he lives in comparative retirement, he succeeds in preserving a better name for honesty.

"There are some of our most familiar birds, of which a word may here be said. Every body has seen the little goldfinch on the thistle by the way-side, and wondered, perhaps, that his taste should lead him to so thorny a luxury; but he is all this while engaged in devouring the seeds, which but for him would overrun the grounds of every farmer. Even the bob-o'-link, a most conceited coxcomb, who steals with all imaginable grace, destroys millions of the insects which annoy the farmer most. All the little birds, in fact, which are seen about the blossoms of the trees, are doing us the same service in their own way.

"Perhaps there is no bird which is considered more decidedly wanting in principle than the woodpecker; and, certainly, so far as man is concerned, there is none more conscientious. So long as a dead tree can be found for his nest, he will not trouble himself to bore into a living one; whatever wounds he makes upon the living are considered by foreign gardeners as an advantage to the tree. The sound tree is not the object; he is in pursuit of insects and their larvæ. In South Carolina and Georgia, forests to a vast extent have been destroyed by an insect, which would seem as capable of lifting a tree as of destroying it. The people were alarmed by the visitation, and sagaciously laid the mischief at the door of the woodpecker, until they found that they had confounded the bailiff with the thief.

"The injury arising from the loss of a single crop is hardly to be estimated. The experience which is taught us by our own misfortune is very dearly bought; and we think that if we can derive it from others, — if, for example, we can learn from the ornithologist the means of preventing such injury, as in many instances we may, — the dictates of economy combine with those of taste, and warn us not to neglect the result of his researches."

It was remarked by Colonel Powel, that "instead of being regaled by the whistling robin and chirping bluebird, busily employed in guarding us from that which no human foresight or labor is enabled to avert, our ears are assailed, our persons are endangered, our fences are broken, our crops are trodden down, our cattle are lacerated, and our flocks are disturbed by the idle shooter, regardless alike of the expensive attempts of the experimental farmer, or of the stores of the laboring husbandman; whilst all the energies of his frame and the aim of his skill are directed towards the murder of a few little birds, worthless when obtained. The injuries which are immediately committed by himself and his dogs are small, compared with the multiplied effects of the myriads of insects which would be destroyed by the animals whereof they are the natural prey."

BUSHES. In many parts of our country, the pasture grounds are infested, and often overrun with noxious shrubs; this is the most slovenly part of our husbandry, and ought to be cured.

Eradicating them, says Deane, requires so much labor, that farmers are most commonly content with cutting them once in a few years. But the more cuttings they survive, the longer lived they are apt to be, and the harder to kill, as the roots continually gain strength.

It is undoubtedly true, that cutting bushes in the summer will do more towards destroying them than doing it in any other season, particularly in August. Other circumstances being equal, the wettest weather is best for destroying shrubs by cutting. Spreading plaster on ground where bushes have been cut may tend to check their re-sprouting, by encouraging the growth of grass.

It is said to be a good method of destroying bushes, to cut them with hoes close to the surface, when the ground is frozen hard ; and that more may be destroyed in a day in this way than in the usual method of cutting with a bush-scythe.

Bushes which grow in clusters, as alder, &c., may be expeditiously pulled up by oxen ; and this is an effectual way to subdue them.

Elder is considered harder to subdue than almost any other kind of bush ; mowing them five times in a season, it is said, will not kill them. The roots of the shrub-oak will not be killed but by digging them out.

To destroy bushes in swamps, flooding two or three summers is the most approved method. But if this is not convenient, draining will so alter the nature of the soil, that the shrubs which it naturally produced before will not be any longer nourished by it ; and one cutting may be sufficient.

After all, extirpation, by digging them out, and by fire, is cheapest and most effectual. — *Farmer's Guide.*

IRRIGATION. The following Essay, by Dr. Jeremiah Spofford, is from the "Transactions of the Essex Agricultural Society."

"Some degree of knowledge of what constitutes the food of plants seems indispensable to any well-conducted system of producing them in the greatest perfection ; and such knowledge seems most likely to be obtained by minutely examining their structure, and carefully observing the manner of their growth.

"Plants constitute one of the great divisions of organic life, and one formed or constituted by systems of fibres and vessels, and endowed with certain powers and appetences which place them at a greater remove above unorganized matter than they are below animal life; and appropriate nourishment is elaborated, and a complete circulation is carried on, to the minutest extremity, in a manner extremely analogous to the circulation which is carried on in the arteries and veins of the most perfect animals; and the apparent intelligence with which plants seek for nourishment, light, air, and support, appears in some instances to bear a strong resemblance to perception and knowledge; and the circulation of fluids in the vessels of plants and animals appears to be carried on much on the same principles, and is perfectly involuntary in both.

"The indispensable agency of *water*, in constituting the fluids, and carrying on the circulation in these systems of vessels, has been universally acknowledged; and could not be overlooked by the most careless observer, while he saw innumerable instances in which plants wither and dry for want of this substance. But while this universal agency has been acknowledged, it is believed that a very inferior office has been assigned to it from that which it really performs. It has been considered as the mere vehicle which carried and deposited the nutritious particles of other substances, while it in reality was contributing much the largest portion of the actual nourishment to the plants which annually clothe our earth in living green.

"If this idea is correct, then he who possesses water at his command with which to supply his plants at pleasure, or who has a soil adapted to attract and retain moisture in suitable quantities, possesses a mine of inexhaustible wealth, from which he can draw at pleasure, in proportion to his industry and his wants.

"In proof of the abstract principle that water constitutes in a very large proportion the food of plants, I may be allowed to mention one or two accurate experiments of distinguished philosophers upon the subject, which appear to me to be quite decisive on the case.

"'Mr Boyle dried in an oven a quantity of earth proper for vegetation, and after carefully weighing it, planted in it the seed of a gourd; he watered it with pure rain-water, and it produced a plant which weighed fourteen pounds, though the earth producing it had suffered no sensible diminution.'

"'A willow tree was planted by Van Helmont in a pot, containing a thousand pounds of earth. This plant was watered with distilled water or pure rain-water; and the vessel so covered as to exclude all solid matter. At the end of five years, upon taking out the plant, he found it had increased in weight one hundred and nineteen pounds, though the earth had lost only two ounces of its original weight.'

"The experiments of Mr. Cavendish and Dr. Priestley have sufficiently proved, that vegetables have the power of decomposing water and converting it into such fluids as they need for circulation in their own vessels; and that they elaborate from this substance such juices and fruits as they are by nature calculated to produce.

"The great effect which is so frequently observed to follow the formation of ditches from the road-sides on to mowing-ground, is, no doubt, in part, to be attributed to the manure which is thereby washed on to the ground, but is also in part owing to the more copious supply of water which it thereby receives.

"That pure water is capable of producing similar effects, I have the following experiments to prove:

"Several years ago, when resident with my father on his farm at Rowley, I labored hard to divert a stream, which fell into a miry swamp, from its usual course across a piece of dry upland. The stream was pure spring-water, which issued between the hills about fifty rods above, running but just far enough to acquire the temperature of the atmosphere, but without receiving any more fertilizing quality than was obtained in passing through a pasture in a rocky channel; the effect, however, was to double the quantity of grass. The same stream I again diverted from its course, about forty rods below, after it had filtered through a piece of swamp or meadow-ground, and with the same effect; and again, still lower down its course, I succeeded in turning it on to a piece of high peat-meadow, which had usually produced but very little of any thing; and the effect was, that more than double of the quantity of grass was produced, and that of a much better quality. I was led to this latter experiment by observing, that a strip of meadow which naturally received the water of this run, and over which it spread for several rods in width without any particular channel, was annually much more productive than any other part of the meadow.

"But the best experiment, and on the largest scale of any which I have known, was made by my late father-in-law, deacon Eleazer Spofford, then resident at Jaffrey, New Hampshire. A letter from Rev. Luke A. Spofford, in answer to my inquiry on this subject, observes: 'My father commenced the experiment as early as the year 1800, and continued it till 1820, or to the time when he sold his farm. The last ten years of his time he flashed perhaps twenty acres; and it produced, I should think, twice as much in common seasons, and three times as much in dry seasons, as it would have done without watering. This land would hold out to yield a good crop twice as long as other land of the same quality,' (that is, I presume, without flowing.) 'In dry weather he watered it every night, and the produce was good, *very good*.'

"I am acquainted with the lot of land which was the subject of this experiment. It is a northern declivity, and rather a light and sandy soil, on the eastern bank of Contoocook river; and the water used was that of the river, about one mile below its formation by the junction of two streams, one from a large pond of several hundred acres in Rindge, and the other a mountain stream, formed by innumerable springs issuing from the skirts of the Monadnock.

"From the foregoing premises may we not conclude, that water performs a more important office in the growth and formation of plants than has generally been supposed; and that it not only serves to convey nourishment, but that it is itself elaborated into nourishment, and thereby constitutes the solid substance? and we may further conclude, that every farmer should survey his premises, and turn those streams which now are often useless or hurtful on to lands where they are capable of diffusing fertility, abundance, and wealth.

"It appears, further, that the immense fertility of Egypt is not so much owing to the alluvial deposit brought down by the annual inundation, as to the canals and reservoirs in which the waters are retained, to be spread over the lands during the succeeding drought, at the will of the cultivator.

"If, according to the experiments of Boyle and Van Helmont, almost the whole food of plants is derived from water, then the principal use of the various manures is to attract moisture and stimulate the roots of plants to absorb and elaborate it; and we have also reason to think that lands are much more injured and impoverished by naked exposure to heat and wind, and washing by water that runs off and is lost, than it is by producing abundant crops.

"In the present state of population, nothing more could be expected or desired, than that every farmer should make use of such means as the small streams in his vicinity may afford; but in a densely peopled country, like Egypt in former ages, or China at present, it should doubtless be one of the first enterprises of a good government to take our large rivers above their falls and turn them off into canals for the benefit of agriculture."

WOODLAND. Ground covered with wood or trees They are mostly designed for fuel and timber. In felling them, care should be taken to injure the young growth as little as possible. Firewood, as well as timber, should be felled when the sap is down; otherwise it will hiss and fry upon the fire, and not burn freely, although it should be ever so long dried. To thicken a forest, or to increase the number of trees in a wood-lot, it should be well fenced, and no cattle be permitted to be in it. And something may be done, if needful, by layers and cuttings. — *Deane.*

The practice of the populous nations of Europe, whose forests have been cut off centuries ago, and who are compelled to resort to measures of the strictest economy to supply themselves with fuel, ought to have great weight with us. France, in an especial manner, ought to be looked up to for wise lessons on this subject. Her vast and thickly settled population, her numerous manufactures, her poverty in mineral coal, the eminence which she has attained in all economical arts, entitle her to great respect. It is the practice of the French people not to cut off their woods oftener han once in twenty or twenty-five years, and by *law*, when they are cut over, the owner is obliged to cut the *whole smooth*, with the exception of a very few trees, which the officers of the government had marked to be spared for larger growth. Without giving any opinion as to the propriety of the direct interference of the government on such a topic, we should say that the example proves, that in the opinion of the French scientific and practical men, it is expedient when woodlands are cut that they should be cut smooth, in order that the new growth might start together, not overshaded by other trees of larger growth. We have no favorable opinion of the utility of cutting down trees in a scattered manner, as they appear to fail, and still less of planting acorns in thinner spots of the forest. The growth thus produced must remain for ever feeble. — *Lowell.*

A valuable paper by the Hon. John Welles, in "The Massachusetts Agricultural Repository," recommends cutting hard-wood trees between forty and fifty years of age; and the writer states, that "though trees may shoot up in height by standing longer, yet the period of the most rapid vegetation is mostly over, and by this means much of the under-growth is necessarily destroyed." Mr. Welles is of opinion, that in cutting over a wood-lot to obtain fuel, it is best to take the whole growth as you proceed. He observes, that "we have been condemned as evincing a want of taste in cutting off our forests without leaving what it would take half a century to produce, — a shade near where it is proposed to erect buildings. The fact is, that trees of original growth have their roots mostly in the upper stratum of earth, and near the surface. A tree acts upon its roots and is acted upon by the wind, sustaining in common with the whole forest the force of this element, and it becomes accommodated or naturalized to its pressure. But when left alone or unsustained, it is borne down by the first gale, often to the injury of property and even of life." The "Farmer's Assistant" likewise says, "if woods are old and decaying, the better way is to cut all off, as you want to use the wood, and let an entire new growth start up, which will grow more rapidly."

INSECTS. It would far transcend our limits to give even a brief description of the various sorts of insects which injure gardens, cultivated fields, &c., and destroy the best productions of our soil. We shall, therefore, confine ourselves to stating, briefly, some of the most approved modes of counteracting the ravages and effecting the destruction of a few of those which are most injurious to the cultivator.

The preventive operations are those of the best culture, in the most extensive sense of the term, including what relates to choice of seed or plant, soil, situation, and climate. If these are carefully attended to, it will seldom happen that any species of insect will effect serious and permanent injury. Vegetables which are vigorous and thrifty are not apt to be injured by worms, flies, bugs, &c Fall ploughing, by exposing worms, grubs, the larvæ of bugs, beetles, &c. to the intense frosts of our winters, is very beneficial. Insects may be annoyed, and oftentimes their complete destruction effected, by sprinkling over them, by means of a syringe, watering-pot, or garden engine, simple water, soap-suds, tobacco-water, decoctions of elder, especially of the dwarf kind, of walnut leaves, bitter and acrid herbs, pepper, lye of wood ashes, or solutions of pot and pearl-ashes, water impregnated with salt, tar, turpentine, &c.; or they may be dusted with sulphur, quicklime, and other acrid substances. Loudon says, "Saline substances, mixed with water, are injurious to most insects with tender skins, as the worm and slug; and hot water, where it can be applied without injuring vegetation, is equally, if not more powerfully, injurious. Water heated to one hundred and twenty or one hundred and thirty degrees will not injure plants whose leaves are expanded, and in some degree hardened; and water at two hundred degrees or upwards may be poured over leafless plants. The effects of insects may also be palliated on one species of plant by presenting to them another which they prefer: thus wasps are said to prefer carrots, the berries of the yew, and the honey of the hoya, to grapes; honey, or sugared water, to ripe fruit, and so on One insect or animal may also be set to eat another; as ducks for slugs and worms, turkeys for the same purpose, and caterpillars and ants for aphides, and so on."

The Rev. Mr. Falconer, one of the correspondents of "The Bath Agricultural Society," strongly recommends soap-suds, both as a manure and antidote against insects. He observes, that "this mixture of an oil and an alkali has been more generally known than adopted as a remedy against the insects which infest wall fruit-trees. It will dislodge and destroy the insects which have already formed their nests and bred among the leaves. When used in the early part of the year, it seems to prevent the insects from settling upon them.' He prefers soap-suds to lime-water, because lime soon "loses its causticity, and with that its efficacy, by exposure to air, and must, consequently, be frequently applied; and to the dredging of the leaves with the fine dust of wood ashes and lime, because the same effect is produced by the mixture, without the same labor, and is obtained without any expense." He directs to make use of a common garden-pump for sprinkling trees with soap-suds, and says, if the water of a washing cannot be had, a quantity of potash dissolved in water may be substituted, and that the washing of the trees with soap-suds twice a week, for three or four weeks in the spring, will be sufficient to secure them from aphides, &c.

Other modes of counteracting the effects of insects are pointed out, in treating of the plants which are most liable to be injured by them. We shall, however, make some remarks on a few of those which are most common and injurious to the interests of the cultivator.

Canker-worm. We shall not attempt to give either a description, or the natural history of the canker-worm, but refer to Prof. Peck's Memoir on the subject, originally published in "The Massachusetts Agricultural Repository," and direct our attention exclusively to the remedies which have been used or suggested to preserve fruit-trees from this formidable enemy.

The female of this insect comes out of the ground late in the fall, early in the spring, or, sometimes, during a period of mild, open weather in winter. Those which rise in autumn or in winter are less numerous than those which ascend in spring; but, being very prolific, they do much injury. One method of preventing the ravages of the worm is, to bar the ascent of the females up the stem of the tree. This has generally been attempted by *tarring*, of which there are several modifications:

1. A strip of linen or canvas is put round the body of the tree, before the females begin their ascent, and well smeared with tar. The insects, in attempting to pass this barrier, stick fast and perish. But this process, to complete the desired effect, must be commenced about the 1st of November, and the tarring continued, when the weather is mild enough to permit the worms to emerge from the ground, till the latter end of May, or till the time of their ascent is past. It is necessary to fill the crevices in the bark with clay mortar, before the strip of linen or canvas is put on, that the insects may not pass under it. Having put on the strip, which should be at least three inches wide, draw it close, fasten the ends together strongly, then tie a thumb-rope of tow round the tree, close to the lower edge of the strip. The design of this is, to prevent the tar from running down the bark of the tree, which would injure it. It should be renewed in moderate weather, once a day, without fail. The best time is soon after sunset, because the insects are wont to pass up in the evening, and the tar will not harden so much in the night as the day

2. Another mode of tarring is, to take two pretty wide pieces of board, plane them, make semicircular notches in each, fitting them to the stem or body of the tree, and fasten them together securely at the ends, so that the most violent storms may not displace them. The crevices betwixt the boards and the tree may be easily stopped with rags or tow; then smear the under sides of the boards with tar. The tar, being defended from the direct rays of the sun, will hold its tenacity the longer, and, therefore, need not be frequently renewed. The trees in this way will be less liable to be injured by the drippings of tar, by leaving a margin of two or three inches on those parts of the boards which are next to the trees, to which no tar is applied.

3. A gentleman informs us, that in Plymouth, Massachusetts, they make use of the following mixture as a substitute for tar in preserving fruit-trees against canker-worms, viz.: White varnish, soft soap, and whale oil, one-third of each to be mixed and applied as tar is usually. This mixture is not soon hardened by the weather, and does not injure the trees. Another simple mode of preventing the ascent of the insects is, to wind a band of refuse flax or swingle-tow round the tree, and stick on the band burdock or chestnut burs, set so closely together that worms cannot pass between them.

The "Massachusetts Agricultural Repository," (Vol III. No. 4,) contains some remarks on the canker-worm, by the Hon. John Lowell, president of "The Massachusetts Agricultural Society," from which the following is extracted:

"I had the turf dug in around sixty apple-trees, and the earth laid smooth. I then took three hogsheads of *effete*, or air-slacked lime, and strewed it an inch thick round my trees, to the extent of two or three feet from the roots, so that the whole diameter of the opening was from four to six feet.

"I tarred these trees, as well as the others, and although I had worms or grubs on most that were not limed, I did not catch a single grub where the trees were limed.

"I do not speak with confidence. I am, however, strongly encouraged to believe the remedy perfect. It was ascertained by Professor Peck, that the insect seldom descended into the ground at a greater distance than three or four feet from the trunk, and to the depth of four inches, or that the greater part come within that distance. The lime is known to be destructive of all animal substances, and I have little doubt, that it actually decomposes and destroys the insect in the chrysalis state; at least, I hope that this is the case.

"There are many reasons which should encourage a repetition of this experiment. The digging round the trees is highly useful to them, while tarring is very injurious. The expense is not great. A man can dig round fifty trees in one day. The lime is a most salutary manure to the tree. After the spot has been once opened and limed, the labor of keeping it open will not be great. Three hogsheads of air-slacked lime, or the sweepings of a lime-store, will suffice for fifty trees, and will cost three dollars. As it is done but once a year, I think it cannot be half so expensive as tarring.

"I repeat it, that I mention my experiments with great diffidence, as being the first of my own knowledge. It may induce several persons to try it in different places, and where trees are surrounded with others which are treated differently. All I pray is, that it may prove successful and relieve us from this dreadful scourge, which defaces our country, while it impoverishes and disappoints the farmer."

The remedies proposed by Professor Peck were, 1st. Turning up the ground carefully, in October, as far as the branches of a tree extend, to half a spade's depth, or five inches, so as completely to invert the surface. A great number of chrysalids would thus be exposed to the air and sun, and of course destroyed. 2dly. Breaking the clods, and smoothing the surface with a rake, and passing a heavy roller over it, so as to make it very hard, and without cracks. In grass grounds the sods should be turned with the grass side down, and placed side by side, so as to be rolled. The winter's frosts would heave and crack a smooth surface, but it might be smoothed and hardened by the roller, or by other means, in March, with much less trouble, time, and expense, than rolling requires. As lime, when slacked, is reduced to an impalpable powder, and is thus well adapted to close the openings in the surface, Mr. Peck is inclined to think its good effects are produced this way as well as by its caustic qualities. — *Thacher's Orchardist*, p. 93.

John Kenrick, Esq., of Newton, Massachusetts, proposed, between the time in June after the worms had disappeared and the 20th of October, to take the whole of the soil surrounding the trees, to the extent at least of four feet from the trunk, and to a suitable depth, and cart it away to a distance from any trees which the canker-worms are in the habit of feeding on; and returning an equal quantity of compost or rich earth intermixed with manure.

A writer for "The New England Farmer," (Vol. III. p. 327,) states a case of an orchard having been preserved from canker-worms by means of a large number of locust-trees, equal to about double the number of apple-trees.

Mr. Roland Howard, of Easton, Massachusetts, observes, (New England Farmer, Vol. IV. p. 391,) that "a quantity of lime was collected from the sweepings of a lime-store, and spread on the ground around a certain apple-tree, some time in the month of November; (the foliage of which tree had been destroyed by the canker-worm the preceding summer;) the ground being in a pulverized state, the lime was spread as far from the trunk of the tree as the drippings from the branches extended: the effect was stated to be the entire disappearance of the worm, and an increased vigor of the tree." The same writer observes, that "moving the earth with a plough or hoe, late in November, or beginning of December, has been found very efficacious in destroying them." This last mentioned remedy, if it will always prove efficient, will probably be the cheapest and most expedient But the worm must be capable of enduring a considerable degree of cold, or unerring instinct would not lead it from its dormitory in November (as it frequently does) to brave the rigors of winter on the stem or branches of the tree We are inclined to believe, as well as to hope, that the application of lime, as above stated, will prove effectual; and if so, it will probably be preferable to any mode of applying tar, or attacking the enemy above ground.

When the insects have ascended, their numbers may be lessened by jarring or shaking the body or limbs of the tree, causing them to suspend themselves by the threads which they spin from their bodies, and striking them off with a stick. It is said, that those which thus fall to the earth do not rise again. Whether they would be able to resist the effects of a sprinkling with soap-suds, saline or bitter infusions, &c., is more than we can say; but we wish their powers might be tested, by showering them with those mixtures which are found to be the best antidotes against other insects.

Caterpillar. "This is one of the worst enemies to an orchard when neglected; but easily destroyed by a little attention. In the spring, when the nests are small and the insects young and tender, they never venture abroad in the early part of the day, when the dew is on the trees, or in bad weather; they may then be effectually destroyed by crushing them in the nest. This attention, continued a short time every spring, will destroy those in existence, and will prevent their increase in future years: if left till grown strong, they wander from their nests, and cannot be effectually overcome without great trouble and expense." — *Coxe, on Fruit-Trees.*

The Hon. Timothy Pickering, in a letter to the corresponding secretary of "The Massachusetts Agricultural Society," has recommended an implement for the destruction of caterpillars. It is made by inserting some hog's bristles between twisted wires, in such a manner as to form a cylindrical brush, which will present bristles on every side. This is attached to a pole, of such length as the trees may require, and the caterpillars are brought down by it, and then crushed. Other methods have been proposed, such as casting over the tree a few handfuls of ashes, in the morning, before the dew is dissipated from the foliage, or after a shower of rain. A strong whitewash of fresh stone-lime, applied by the means of a mop, or sponge, fixed to the end of a pole, strong soap-suds, spirits of turpentine, a little oil of any kind, particularly blubber oil, are likewise fatal to the insects. But, perhaps, the most effectual remedy is the *hand*, by which the insects may easily be removed at an early stage; but if this be neglected, it is thought that the next best remedy is the use of Colonel Pickering's brush, as above. In applying either of these remedies, care must be taken to choose that part of the day when the caterpillars are in their nests. They rarely quit them till nine o'clock, and generally return to them again about twelve.

Curculio. This is a small bug, or beetle, which perforates the young fruit of the pear, apple, and all stone fruits, and deposits its eggs in them. The eggs soon hatch, and a small maggot is produced, which feeds either on the pulp of the fruit, or on the kernel of the seed; for the tastes and habits of the different species are not similar. In the stone fruits, this injury destroys their growth, and they fall, with the little enemy within them. The insect retreats into the earth, and passes the winter in the chrysalis state, and comes forth just as the young fruit is forming, or the petals of the flowers are falling, to renew its mischievous labors. This insect continues its depredations from the 1st of May until autumn. Dr. James Tilton, of Wilmington, Delaware, in an article on this subject, published in the American editions of "Willich's Domestic Encyclopedia," observes, that "our fruits, collectively estimated, must thereby be depreciated more than half their value;" and adds, in his directions for destroying the insect, "all the domestic animals, if well directed, contribute to this purpose. Hogs, in a special manner, are qualified for the work of extermination. In large orchards, care should be taken, that the stock of hogs is sufficient to eat up all the early fruit which falls from May till August. This precaution will be more especially necessary in large peach orchards; for otherwise, when the hogs become cloyed with the pulp of the peach, they will let it fall out of their mouths, and content themselves with the kernel, which they like better; and thus the curculio, escaping from their jaws, may hide under ground till next spring."

"The ordinary fowls of a farm-yard are great devourers of beetles. Poultry in general are regarded as carnivorous, in the summer, and therefore cooped some time before they are eaten. Every body knows with what avidity ducks seize on the tumble-bug, (*scarabœus carnifex,*) and it is probable, the curculio is regarded by all fowls as an equally delicious morsel. Therefore it is, that the smooth stone fruits, particularly, succeed much better in lanes and yards, where poultry run without restraint, than in gardens and other inclosures, where fowls are excluded."

Instead of turning swine into orchards, to pick up the fruit which falls, and thus destroy the worms which it contains, it will often be found most expedient to gather such fruit, and give it to swine in pens, &c., either raw, or, what would be better, boiled. If such measures were generally taken with fruit which falls spontaneously, as to prevent the insects, which generally cause it to drop prematurely, from escaping into the ground, the worms, which destroy one half our fruit, and very much deteriorate a considerable part of the other half, would soon be extirpated from our orchards and fruit-gardens.

***Aphis*, *Plant-louse*, *Puceron*, or *Vine-fretter*.** "This genus of insects comprises many species and varieties, which are so denominated from the plants they infest. The males are winged, and the females without wings; they are viviparous, producing their young alive, in the spring; and also oviparous, laying eggs in autumn. Water, dashed with force from a syringe, [or garden engine,] will prove as destructive to them as any thing, when on trees; and smaller plants may be washed with lime-water, with tobacco-water, with elder leaves, infused in water, or with common soap-suds, any of which will destroy the insects." — *Loudon.* "Tie up some flour of sulphur in a piece of muslin, or fine linen, and with this the leaves of young shoots or plants should be dusted, or it may be thrown on them by means of a common swan's-down puff, or even a dredging box. Sulphur has also been found to promote the health of plants, on which it was sprinkled, and that peach trees, in particular, were remarkably improved by it." — *Domestic Encyclopedia.* "In green-houses, they are readily destroyed by the smoke of tobacco, or of sulphur; but in the open air, fumigation, though much in vogue many years since, is of no avail. The best remedy is the simplest. Soap-suds, forcibly applied, will, after one or two applications, effectually destroy them, without apparent injury to the plant." — *Deane.*

A writer for "The New England Farmer," (Vol. III. p 9,) after stating a number of experiments with soap-suds, for destroying aphides, which were unsuccessful, or but partially succeeded, says, "I was led to conclude, that it is not sufficient to wet the upper side of the leaves, thinking to make them disagreeable or poisonous to the insect, but that they must be well drenched or immersed in the suds. I therefore applied again the same remedy; but with this difference, — instead of sprinkling the upper side of the branches, I carried a pailful of suds from tree to tree, and, bending the tops of small trees, and the branches of larger ones, immersed all the parts infested with lice, holding them in the liquor for a moment, that none might escape being well wet. On examining the trees, the next day, the greater part of the lice were destroyed. It was found necessary to repeat the same process once or twice, with suds not too weak, say about two or three ounces of soap to a gallon of water." Another writer in the same paper, (p. 10,) says, "I have applied soap-suds to my apple-trees, in order to kill the lice. It will be sufficient for me to say, that just sprinkling them with suds will not kill them; neither will dipping the branches which are infested with them kill them. But dipping and holding them in, as long as I can conveniently hold my breath, will destroy every one. The suds do not appear to injure the leaves. I tried suds made on purpose, and suds which had been used for family washing.

The latter answers the purpose much the best." It is possible to make soap-suds so strong as to kill the tender branches, as well as the insects which infest them. The proportion above mentioned, of two or three ounces of soap to a gallon of water, is probably most advisable.

Cut-worm. This is an ash-colored worm, with a stripe almost black on its back. When fully grown, it is about the size of a goosequill, and about an inch and a quarter in length. They are very apt to cut off young cabbages, cauliflowers, beets, &c. They never voluntarily appear on the surface of the ground in the day time, but may be found about an inch below it. In the night they make their excursions, cut off the stems of young plants, just at the top of the ground, and again bury themselves.

Dr. Deane observed, "I once prevented their depredations in my garden, by manuring the soil with sea-mud, newly taken from the flats. The plants generally escaped, though every one was cut off in a spot of ground that lies contiguous. From the success of this experiment, I conclude that salt is very offensive or pernicious to them. Lime and ashes, in some measure, prevent their doing mischief; but sea-water, salt, or brine, would be more effectual antidotes. The most effectual, and not a laborious remedy, even in field-culture, is to go round every morning, and open the earth at the foot of the plant, and you will never fail to find the worm at the root within four inches. Kill him, and you will save not only the other plants of your field, but, probably, many thousands in future years."

There is some danger, in making use of salt, brine, or sea-water, of injuring the plants in attempting to destroy insects; and we should, therefore, generally prefer decoctions of elder, walnut leaves, or tobacco. Mr. Preston, of Stockport, Pennsylvania, preserved his cabbage-plants from cut-worms by wrapping a hickory-leaf round the stem, between the roots and leaves. — *New England Farmer,* Vol. III. p. 369. The Hon. Mr. Fiske, of Worcester, Massachusetts, in speaking of this insect, says, "To search out the spoiler, and kill him, is the very best course; but as his existence is not known except by his ravages, I make a fortress for my plants with paper, winding it conically and firmly above the root, and securing it by a low embankment of earth." — *New England Farmer,* Vol. IV. p. 362.

Lice on apple-trees. There is a species of insect infesting apple-trees which may be styled the *bark louse*, to distinguish it from the *plant louse*, or *aphis*. It is, in form, like half a kernel of rye, but much smaller, with the flat side sticking to the bark of the tree. Jesse Buel, Esq., of Albany, gives the following statement of his mode of destroying them: "In June last, I observed directions in 'The New England Farmer,' for destroying the parasitic enemy; and, that being the particular time to make the application, I immediately set about it. For this purpose, I took eight parts of water and two of soft soap, and mixed with these lime enough to make a thick whitewash. With a whitewash and paint brush I put this upon the trunks and limbs of trees, as high as was practicable, filling the cracks in the bark, and covering the whole surface. The effect has been, not only to destroy most of the lice, but to give the trees an improved and vigorous appearance. The outer bark, which, from a stinted growth, had become rough and hard, has, in a measure, fallen off in flakes, and disclosed a soft, smooth bark, the sure indication of health."

Apple-tree Borer. (*Saperda bivitata.*) The scientific description of this very pernicious insect is thus given by Professor Say, of Philadelphia: "'Hoary; above, light-brown, with two broad white fillets. Inhabits the United States *Body*, white; *eyes*, fuscous; a small spot on the vertex, and another behind each eye, light-brown; *antennæ*, moderate, slightly tinged with bluish; *thorax*, light-brown, with two broad, white lines, approaching before; *elytra*, light-brown, irregularly punctured; a broad, white, longitudinal line on each, nearer to the suture than to the outer edge. Length, from one-half to seven-tenths of an inch. A very pretty insect. In the larvæ state, it is very injurious to the apple-tree, boring into the wood."—*Journal of the Academy of Sciences*, *Phil.*, Vol. III. p. 409.

Professor Say, in a letter to Jesse Buel, Esq., says, "You state that it leaves the pupa, and becomes perfect, in the latter part of April, and that the eggs are deposited beneath the surface of the soil. These two circumstances ascertained, I would recommend the application, early in May, or the latter part of April, of common bricklayer's mortar, around the base of the tree, so as to cover completely the part, and its immediate vicinity, where the deposit is made. This preventive was successfully employed by Mr. Shotwell against the attacks of the peach-tree insect, (see 'American Farmer,' Vol. VI. p. 14,) and I see no reason why it should not be equally efficacious in the preservation of the apple-tree." — *Memoirs of the New York Board of Agriculture*, Vol. III. p. 479.

The "Massachusetts Agricultural Repository," (Vol. V. p. 360,) contains a paper on this insect, by John Prince, Esq., by which it appears, that worms of this kind are got rid of by "digging round the tree, and clearing away the earth to the roots, and then, with a sharp-pointed knife, a chisel, or a gouge, and a small wire to probe, if they are deep in the tree, they may easily be destroyed." After taking out the worms, the wounds should be covered over with grafting-clay and a large proportion of dry wood ashes mixed, and the earth then returned to the tree. The process for cleansing the trees from borers should be performed in the spring, as soon as the frost is out of the ground, or at least before the month of June, as the perfect insect escapes before that time.

Slug-worm, or *Naked Snail.* These reptiles appear on the leaves of fruit-trees in the month of July. Professor Peck has ascertained that they are the progeny of a small black fly, which deposits its eggs in the leaf in the months of May and June. They may be destroyed by means of lime, sprinkled over the leaves in the form of powder. For this purpose, a wooden box, of convenient size, having its bottom perforated with numerous small holes, is to be filled with lime. This being mounted on a pole and shaken over the tree, distributes the lime among the leaves, and the slugs are immediately destroyed. The labor is very trivial; a man may cover a large tree in three or four minutes; and the desired effect is certain. Fine earth shaken through a basket or perforated box will answer as well.

"Another remedy, it is said, will prove equally effectual. It is a strong infusion of tar, made by pouring water on tar, and suffering it to stand two or three days, when it becomes strongly impregnated. This, if sprinkled over the leaves by means of an engine, will kill these vermin instantaneously. A strong decoction of tobacco will probably produce the desired effect, and tanner's bark put round the tree, it is said, will have a salutary tendency as a preventive." — *Thacher's Orchardist.*

Forsyth recommends watering the ground where these insects are with soap-suds and urine, mixed with tobacco-water. Ducks admitted into a garden will destroy all within their reach.

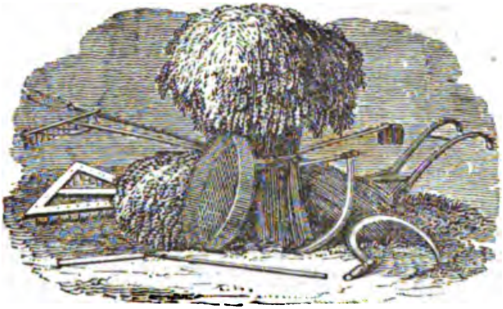
Wire-worm, or *Red-worm*. This insect is slende , and usually about an inch long, with a hard coat, and a pointed head. Mr. William Moody, of Saco, (Maine,) in a communication to Hon. Josiah Quincy, published in "The Massachusetts Agricultural Repository," (Vol. IV. p. 353,) observes, "I am persuaded, from experience, that sea-sand, put under corn or potatoes with manure, or spread on the land, will go far, if not wholly, to the total destruction of these destructive worms, on which nothing else seems to have any effect. It has a beneficial effect spread on land before ploughing, or even after land is planted with corn or potatoes, not only to destroy the wire-worm and other insects, but to increase the crop. With my neighbours, a load of sea-sand is considered as preferable to a load of the best manure, to mix in with their common barn manure, or to spread on their gardens and low flat land."

Probably sea-mud or sea-water would produce good effects as preservatives against this and other insects.

Soaking seed corn in a solution of copperas in water, has been found effectual against this insect. See page 30 of this work.

The *Striped Bug*, or *Yellow Fly*. This is a small insect of the *coleoptera* order, or such as have *crustaceous elytra*, or wing cases, like the beetle. The elytra of this bug are striped with yellow and black. They prey on the young plants of cucumbers, melons, squashes, and others of the *cucurbitaceæ* species. "These insects may be considerably thinned by killing them in a dewy morning, when they have not the free use of their wings, and cannot well escape. But nothing that I have tried has proved so effectual as sifting or sprinkling powdered soot upon the plants when the morning dew remains on them. This forms a bitter covering for the plants, which the bugs cannot endure the taste of." — *Deane*. "We would recommend sprinkling the plants with a little sulphur or Scotch snuff." — *Farmer's Assistant*. But the surest defence against these insects is, inclosing the plants with a frame, and a muslin or gauze covering.

For able and scientific descriptions of most of the insects which infest our fields and gardens, we would refer to a "*Discourse* delivered before the Massachusetts Horticultural Society, by Thaddeus W. Harris," published in "The New England Farmer," Vol. XI. p 204, and following pages.



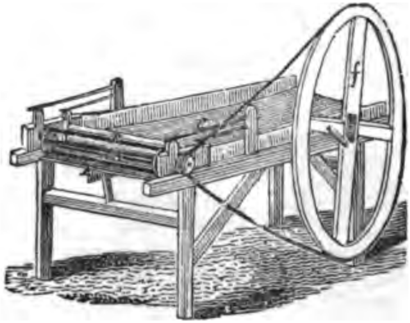
AGRICULTURAL IMPLEMENTS.

It was remarked by Sir John Sinclair, that the introduction of new agricultural implements into a district is often a matter of the greatest difficulty, owing to the ignorance, the prejudice, and obstinacy of farm servants and laborers. Many farmers, therefore, very absurdly retain their old implements, though convinced of their inferiority, rather than sour the tempers of their laborers by attempting to introduce new ones; in many cases however they have succeeded by attention and perseverance, and by rewarding their laborers many new and valuable implements have been brought into general use.

The farmers of New England are too enlightened, and have too much regard for their own best interest, to be under the dominion of such profitless prejudices. Accordingly, we find not only a very increasing demand for new and improved agricultural machines, tools, &c., but that our practical farmers see that it for their interest to procure the best.

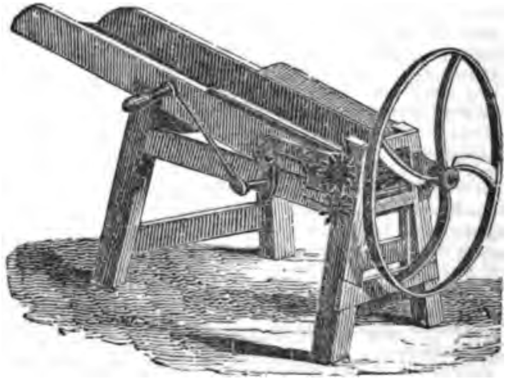
The Agricultural Warehouse and Seed Store, in Boston, 51 and 52 North Market Street, Jos. Breck & Co. proprietors, has become so extensive and of so much importance to the community, as to induce the proprietors to continue and extend it in all its various branches for the accommodation of the practical and scientific farmer, by the introduction of new and useful implements of husbandry, and to furnish the best tools for his business.

An establishment of this kind not only answers the above purpose, but serves as a depository in which the inventive artisan may place his articles for sale. The proprietors do not hesitate to say, that among the variety of articles on hand at this establishment, many are far superior in their form and construction, and far better adapted to the purpose for which they are intended, than any others which have been in use in this country.



Threshing Machines. Pope's improved threshing machine was invented by the late Joseph Pope, Esq., of Hallowell, Maine, and has been in successful operation in different parts of the country for many years, and is found to be the best operating machine for all kinds of grain that has been in use; it is well adapted for getting out rice.

Hale's Threshing Machine. Hale's newly invented rice and grain threshing machines are found on trial to be the most thorough and effective implements we have had in operation for the purpose intended; it is a very simple operating machine, and powerful and quick in its motion; does the work well, separates and cleans the grain at the same time. This machine must be to the rice planter an indispensable implement; it requires but one man and a horse to work it.



Straw Cutters. The straw cutter is a machine well worth the attention of every farmer, and should be in common use with every person feeding stock; and from the great improvement and simplicity of the machines now in use, the work is done with great expedition and facility. It is a subject of great regret to every friend of the agricultural interest, that these machines are not in more general use. Every farmer who is disposed to use fodder to the best possible advantage, and preserve his animals in the best health, in all cases cuts his fodder. For farther explanation of the profits and advantages arising from cutting fodder, the following statement is given:

Mr. Benjamin Hale's account of the savings made by the use of Straw Cutters, employed to cut Hay and Straw as Fodder for Horses.

Mr Hale is proprietor of a line of stages running between Newburyport and Boston. He says,

	Tons.	*cwt.*	*qrs.*	*lbs.*	
The whole amount of hay purchased from April 1 to Oct. 1, 1816 (six months), and used at the stage stable, was	32	4	0	10	
At twenty-five dollars per ton, (the lowest price at which hay was purchased in 1816,)					$800 00

From Oct. 1, 1816, to April 1, 1817, whole amount of hay and straw purchased for, and consumed by the same number of horses, viz.:

	T.	*cwt.*	*qrs.*	*lbs.*	*Cost.*
Straw	16	13	3	10	$160 23
Hay	13	14	1	00	350 00
					$510 23

Deduct on hand April 1, 1817, by estimation, four tons more than there was Oct. 1, 1816, at twenty-five dollars per ton,	100	$410 23
Saving by the use of the straw cutter, four months of the last six months, or the difference in expense in feeding with cut fodder, and that which is uncut,		$389 77

	T.	*cwt.*	*qrs.*	*lbs.*	
Whole amount of hay used for the horses of the Salem stage, twenty-five in number, from April 1 to Oct. 1, 1816, viz..	22	0	0	0	
At thirty dollars per ton, (the lowest price in Salem,)					$660 00

Whole amount consumed by the same number of horses, from Oct. 1, 1816, to April 1, 1817,

	T.	*cwt.*	*qrs.*	*lbs.*	*Cost.*	
Straw	15	13	0	0	$187 80	
Hay	2	15	0	0	81 00	
						$268 80

Saving in using chopped fodder five months,	$391 20
Total saving in using the straw cutter nine months, viz.: at Newburyport, four months,	$389 77
At Salem, five months,	391 20
Total,	$780 97

The members of the board of trustees of the Massachusetts Agricultural Society, to whom the above account was communicated by Mr. Hale, were informed by that gentleman, that he used no more grain from Oct. 1816, to April, 1817, than was used from April, 1816, to Oct 1816.

Remarks.—There is not only much saving and gain in cutting fodder when hay is low, but the animal is kept in better health, more particularly old horses, and such as may have been injured in their wind.

It is a fact that horses will live and continue serviceable much longer when fed on cut fodder. The machine invented and manufactured by Willis, known as "*Willis's improved Straw and Hay Cutter*," is the most durable and best operating machine that has come to our knowledge; and what is worthy of notice, they require but one person to operate them, which is not the case with many other machines; in this there is a great saving in cutting feed, and likewise the fodder may be cut of any length required; the knives being placed in front of the machine, can be at all times examined and kept in good order. The feeding rollers are so constructed, that while the machine is in the act of cutting, the rollers cease to feed, which renders the cutting operation very easy.

Eastman's Straw Cutter, with improved side gearing and cylindrical knives. This machine is well calculated for large and extensive establishments. Price, fifty to sixty dollars.

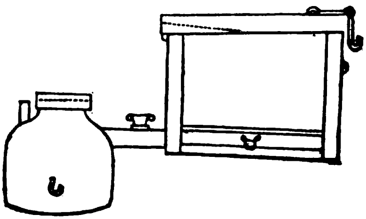
Willis's Vertical Straw and Hay Cutter. It is well constructed, made of the best materials and of the best workmanship. Fed and worked by one man; works free and easy, and not liable to get out of order. It will cut from thirty-five to forty bushels per hour. Price thirty-five dollars. For the cost this is the best machine in use.

This is to certify, that I have used Willis's improved straw cutter the past season, and consider it the best machine for the purpose now in use.
NATHAN ADAMS.

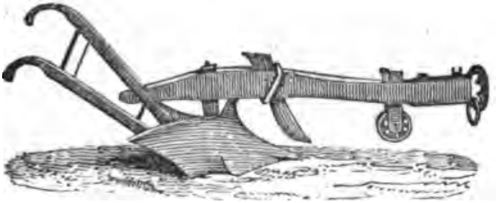
The Common Dutch Hand Cutting Machine, is one of those implements in common use, and known to every practical farmer; and is considered as good a machine for a small establishment as any in use. Will cut from ten to twenty bushels per hour.

Safford's Improved and Common Straw Cutter, with side gearing; well approved, and is in very general use.

Green's Patent Straw Cutter. The most approved machine now in use for cutting fodder: very simple in its construction, and in no way liable to get out of order; does the work with great ease and despatch.



Root Steamer. The above cut represents a root steamer, described in the Farmer's Magazine, (a work printed in Scotland,) Vol. XVIII. page 74, and alluded to in page 51 of the present work. It consists of a boiler, and wooden chest or box placed over it or near it. The box may be of any size, and so placed, as to be supplied and emptied by wheel and hand barrows in the easiest manner, either by the end or top, or both, being made to open. "If the box is made eight feet by five, and three deep it will hold as many potatoes as will feed fifty cows for twenty-four hours and these may be steamed in an hour."



Ploughs. This implement, one of the oldest and most useful employed on a farm, has undergone of late years a wonderful change in all its most essential parts, and has been greatly improved. The cast iron plough is now most generally used among the best farmers, and considered decidedly the best. Among the different ploughs now made of cast iron, Howard's stands unrivalled. They have been used at the different cattle shows and ploughing matches, and have in all cases been approved by them. At the Brighton cattle show at the exhibition in October, 1832, they received the premium of ten dollars, awarded as being the best plough presented.

[Extract from the Report of the Committee.]

"The ploughs were all of cast iron, and by six of the most approved manufacturers. The one by Mr. Charles Howard, of Hingham, was a superior implement, considerable improvements having recently been made by him, in making the mould-board longer than usual, and swelling the breast of the share, so as to make every part bear equally; by which means the plough runs more true and steady, is always free from carrying forward any earth, and wears perfectly bright; and being made on mathematical principles, he informed the committee he could make the different sizes always the same."

JOHN PRINCE,
EBENEZER HEATH,
JOHN BAKER, 3d.

"The duty of awarding a premium 'to the plough which shall be adjudged best of all those used at the ploughing match,' devolved on the *two committees*, and they agreed unanimously to award it to Mr. Charles Howard, of Hingham, for his new and improved plough; ten dollars."

GORHAM PARSONS,
Chairman of Single Teams.
JOHN PRINCE,
Chairman of Double Teams.

There has been no plough presented since 1832 which has been considered better than the Howard plough; therefore the committee have not awarded a premium since that year; they still offer the premium of ten dollars for the best plough.

Side hill Plough. This plough, for which a premium was given at Brighton, is found to be a very great improvement on the ploughs now in use, for working on side-hills. The mould-board is so constructed as to shift on each side, as may be required, by turning on the under side of the plough as the team turns at each end of the furrow.

Howard's Improved Double Mould-Board Plough. This plough is well calculated for furrowing out land, splitting hills, ploughing between corn, potato, and vegetable cultivation, to great advantage. A great labor-saving machine; saves nearly all the hoeing of corn or potatoes.

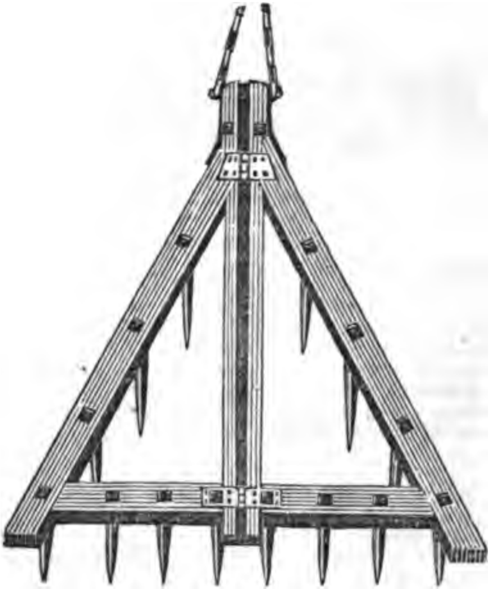
Bigelow's Plough. This plough is made of wrought iron, and is in general use, and very much approved, being very strong and quite light, does the work well with little labor.

Morse's Plough. Similar to Bigelow's, but a better made article.

Rice's common Wood Plough. Of all sizes.

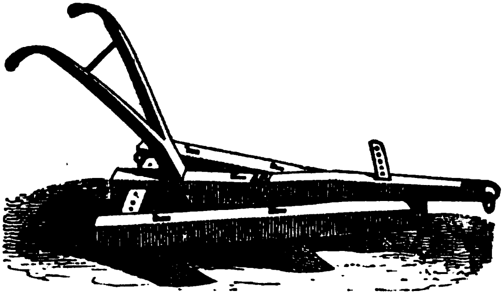
Shovel Plough, and Plough Scrapers Of all sizes, made to order at the shortest notice.

Quaker Hand Plough. For gardens, a very useful implement, and used to great advantage in garden cultivation. Steel pointed.



Chandler's Improved Double Harrow. This harrow is so constructed as to be in two parts, and joined together by hinges on two straight centre pins, so that one part can be raised and swung over on the other half as occasion requires. Its advantage over the common harrow is, that it is less liable to be stopped, as one side may be elevated or turned to a perpendicular position, while the other side proceeds horizontally; it may thus be drawn nearer to rocks, trees, &c. It will likewise better adapt itself to ridges, hollows, and uneven land.

Tree and Bush Pullers. The tree and bush puller is one of the most useful and effective implements in use; it is employed in clearing land of under brush, small trees, barberry and other bushes. It is of iron of any size or dimensions required, something in the form of a rake or claw, with the teeth much bent. The ground is loosened around the tree or bush which is to be removed. The teeth or claws are entered on one side, a horse or oxen are attached by a chain to the claw and drawn on the opposite side. One man and horse or one yoke of oxen will do more work with this implement than five men can do without it, in digging and clearing land.



Cultivators. Howard and Seaver's patent fixed and expanding cultivators, of all sizes. The cultivator is an implement that is coming into very general use in all parts of the country, and serves in a great measure in lieu of hoeing. The teeth are so constructed as to raise the ground, and leaves it very light and free for cultivation, and at the same time destroys the weeds; and is well adapted to southern and western cultivation.

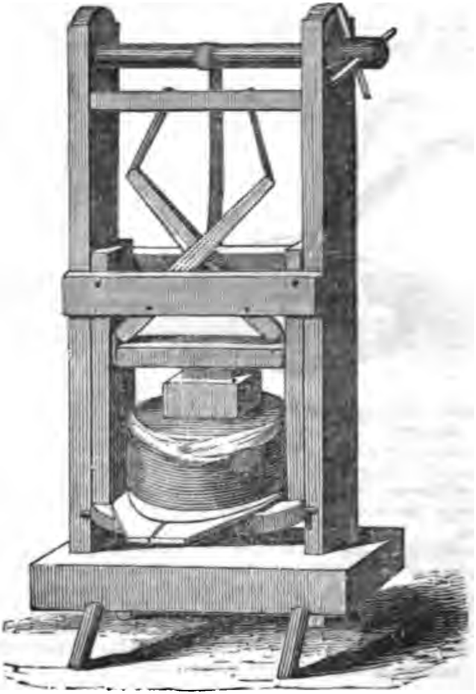
These cultivators are adapted to all kinds of ground, for running through rows of corn, potatoes, and vegetables of all kinds; and used in the cultivation of hops, instead of the plough and hoe, and are found far superior to either It is likewise well adapted to harrow in grain and grass seed; and, for the many uses to which this implement may be applied, it must be considered one of the most valuable tools that is used on a farm, and is coming into very general use.

This certifies, that I have used Seaver's cultivator, and find it a much better article to work among corn and potatoes, than any machine that I have ever tried; it clears the weeds between the rows much more effectually than either a plough or harrow, and saves a great deal of labor. BENJ. WHEELER.

Framingham, 1834.

Broad-Cast Machine. Bennet's broad-cast machine. This machine, which is designed for sowing broad-cast is found, when used on smooth and even ground, to answer a good purpose, sows very regular and even, and is used with great despatch.

Tree Brushes. Pickering's improved wire brushes are found to be the most effective implements for the purpose of clearing trees and destroying caterpillars, of any thing that has ever been used. This brush, which is made in a spiral or taper form, and about eight inches long, is fixed on the end of a pole, the small part of the brush is entered into the webs, and a moderate twist of two or three turns takes the web and all connected with it clear from the tree. It should be used very early in the morning and late in the afternoon, when the insects are in their nests.



Cheese Presses. Quaker's improved self-governing cheese press. The press is so constructed as to govern and regulate itself, in pressing a cheese of any size, without any weights.

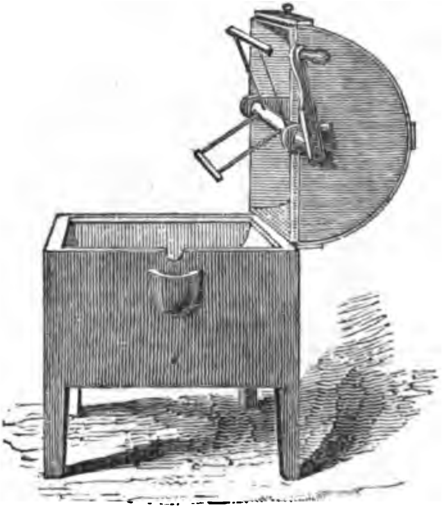
Leavett's Improved Cheese Press; which is so constructed, that seven or fourteen pounds' weight will press any common sized cheese.

Cheese Hoops, different sizes.

Cheese Cloths.

Curd Mills, for cutting cheese curds, which facilitates the labor of the dairy.

Lactometers. This invention is found to be of great utility and advantage in testing the quality of cream given by each cow. It consists of a small mahogany frame which contains four or six glass tubes of ten inches in length and half an inch in diameter. These tubes are divided into tenths, and numbered from one to ten, which show the quantity of cream given by each cow. This little article is found very useful, and is much used in large dairies.



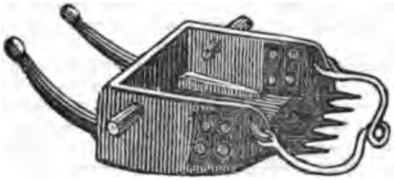
Gault's Patent Churn, which has been in use for several years, is the most approved and convenient churn now in use. The particular advantage is the facility with which it can be worked. From its quick and powerful motion it will produce the greatest quantity of butter from the same quantity of cream; is easy to clean, and no way liable to get out of order.

Mr. Fessenden, *Editor of the New England Farmer*.

Sir, — In answer to the inquiry respecting the Gault's churn, which I purchased at the agricultural warehouse, I give it as my decided opinion, that they are the best churns I have ever seen in use. They are very convenient to keep clean, bring the butter very easy, and require not more than fifteen or twenty minutes to do a churning.

Respectfully yours, B. REYNOLDS
Sharon, June 15, 1829.

Stone Churn. A small article, well calculated for small families.



Davis's Improved Patent Dirt Scraper. This road or dirt scraper, invented by Shadrock Davis, is used to great advantage in removing dirt or gravel, more particularly in stony lands, from the peculiar construction of the points, which are similar to those of a plough point. They enter the ground very free and easy, fill and discharge themselves, and are easily managed by one horse or a yoke of oxen. Ploughing is unnecessary where these shovels are used.

We the undersigned hereby certify, that we have used Davis's patent plough-pointed road and dirt scraper, and we consider it a great improvement on the common road scraper, and can with confidence recommend it to the public, as being superior to any implement of the kind we have ever used, particularly in sandy and stony land, being so constructed as to load itself without the use of ploughing, which is common in using the old-fashioned dirt scraper. We consider it one of the greatest labor-saving implements to the road-maker that can be used, and as such we fully recommend it to the public.

ABM. WASHBURN, *Bridgewater.*
HENRY S. PACKARD, *North Dartmouth.*
BRADFORD HOWLAND, *South Dartmouth.*

Pruning Shears. This article, which was formerly made by Wakefield, of Gardener, has since been very much improved, and is now considered as one of the best and most approved implements in use, and has taken the place of the pruning knife; and for grape vines and small trees is considered much the best; as upon an easy drawing stroke it cuts very smooth and fair without injury to the bark or wood.

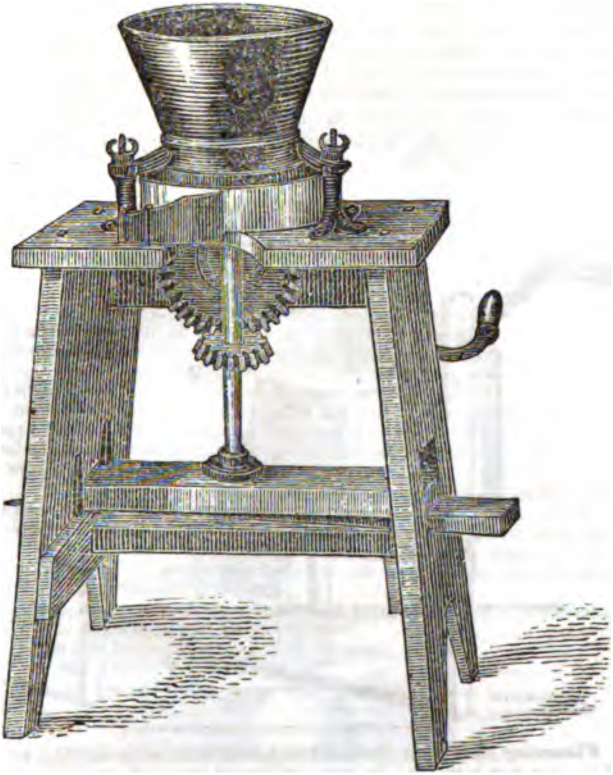
Scythes. The agricultural concave scythes, which are found, from the peculiar form and shape in which they are made, to cut upon the principle of a drawing stroke, and are very easily ground and kept in good order, and are considered the best scythes that are manufactured. From the peculiar construction of these scythes the edge is always left true in the middle of the scythe.

Scythe Rifles. Austin's and Derby's rifles are considered the best articles made for the purpose. They are about the size of the common sand rifle, are cased with fine emery, and give a very sharp and good edge. They are of very general use, and good substitutes for the scythe stone.

Scythe Snathe. This article, though in very common use, has been altered and improved to great advantage within a few years past. The snathes manufactured by Vickery Baker for the proprietors of the agricultural warehouse are found to be the most approved and best calculated to work free and easy. The regular quick turn at the heel, and the strong and substantial iron rings which secure the scythe and nibs, are considered a great improvement in those snathes.

Willis's Patent Brass Syringe. This syringe is intended for watering all kinds of green-house and out-door plants, and for preserving grape vines from mildew, and has been used with a solution prepared for that purpose, with great success. See the following recipe:

Take a pint and a half of sulphur, and a lump of the best unslacked lime; put these in a vessel of about seven gallons' measurement; let the sulphur be thrown in first, and the lime over it; then pour in a pail of boiling water, stir it well, and let it stand half an hour; then fill the vessel with cold water, and after stirring well again, allow the whole to settle; after it has become settled dip out the clear liquid into a barrel, and fill the barrel with cold water, and it is then fit for use. You next proceed with a syringe holding about a pint and a half, and throw the liquid with it on the vines in every direction, so as to completely cover foliage, fruit, and wood; this should be particularly done when the fruit is just forming, and about one-third the size of a pea, and may be continued twice or thrice a week for two or three weeks. The whole process for one or two hundred grape vines need not exceed half an hour.



Harris's Improved Paint Mill. This mill can be used by hand, horse, or any other power that it may be attached to, and works to great advantage. From the very plain and simple manner of its construction, it is easily taken to pieces and cleaned, and shifted from one place to another, and used with great facility, and is considered one of the best and most useful mills in use.

CERTIFICATES FOR HARRIS'S PAINT MILL.

I the undersigned hereby certify, that I have used Harris's improved patent paint mill, purchased at the agricultural warehouse, Boston, and consider it the best and most convenient mill for the purpose intended of any I have ever used. It is very readily cleaned and put in order.

Hingham, Feb. 20, 1834. SETH B. CUSHING.

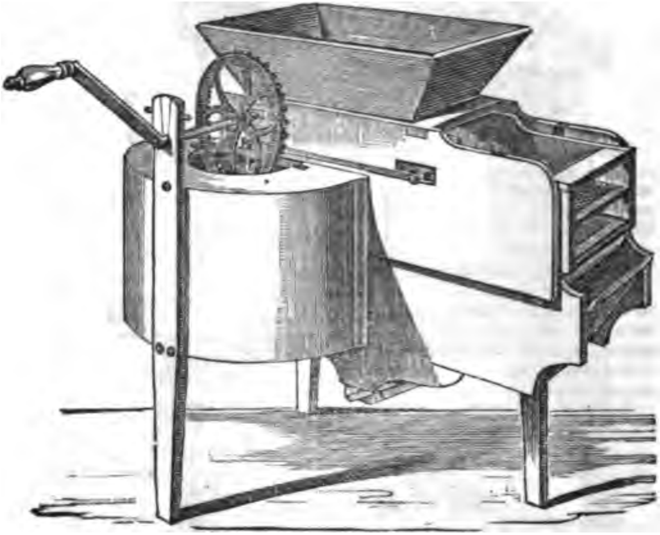
I the undersigned do certify, that I have used one of Harris's paint mills for grinding a variety of paint for about two years, and do not hesitate to give it the preference to every other mill I have ever used.

Ware, May 26, 1834. THOMAS B. WESTERN.

I hereby certify, that I have been in the paint business for fifteen years, and have used different kinds of paint mills, and have not found any so good as Harris's patent mill. I have ground with one of these mills one hundred pounds of lead in two hours. I. BARTLETT.

I have used one of Harris's patent paint mills for grinding small colors for some time past, and find it the best mill for the purpose in use.

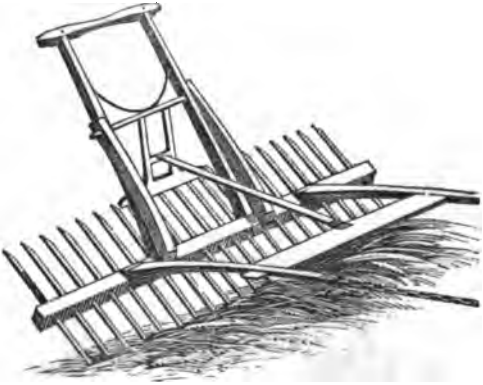
Boston, June 20, 1834. GEORGE YENDELL.



Winnowing Machines. Holmes's improved winnowing machine is one of the best that is in use. It is very plain and simple in its construction, and very powerful in its operation; is well calculated for cleaning all kinds of grain, and may be applied to many other purposes, such as cleaning rice, coffee, &c.

Elliot's patent horizontal mill is for the same purpose. Though smaller and more compact, is found equally as good; is considered as an improvement on the common winnowing machines now in use. The motion of the flyers is horizontal, and the sieves have a forward and backward motion.

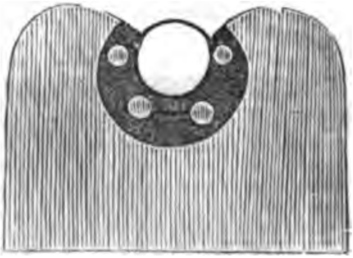
Grain Cradles. This article, like the scythe snathe, has undergone a very great alteration and is much improved. The scythe is well secured, and finished in a superior manner, and made of the best cast steel.



Revolving Horse Rake. The revolving rake, which has been in general use in most parts of Pennsylvania and New Jersey, is found to be one of the most useful and labor-saving machines now in use. One man and horse, with a boy to lead, will rake on an average from ten to fifteen acres per day with ease, and do the work well. They are coming into very general use in all parts of the country, and will no doubt in a few years supersede the use of the common hand rake.

Cast Steel and Common Axes. This very common article among our farmers is one of the most useful implements ever invented. Underhill's cast steel axes have been considered as the best, and most approved in form and shape, and are warranted in every respect to be of the best quality. They are finished in the most perfect manner, and ground to a fine smooth cutting edge.

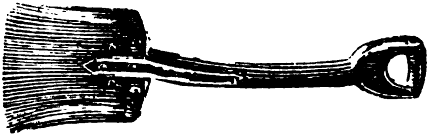
Hatchets, cleavers, and many other tools, made by different workmen, and finished in the same manner.



Hoes. Great improvement has been made in this article of late. A great variety of hoes are now manufactured, of different forms. Those made by Morgan are considered the best now in use; they are made of the best of steel crooked neck, and socket handles.

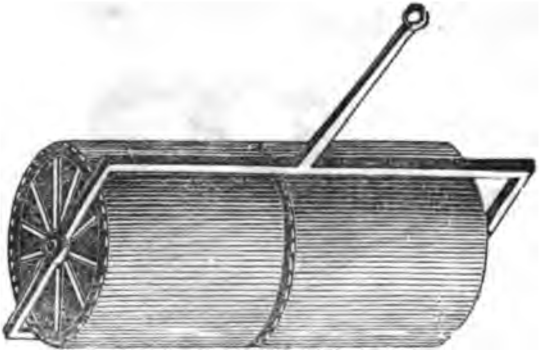
The Prong or *Potato Hoe* is one of the most useful, simple, and improved implements that is employed. It was invented and used in the first instance for digging potatoes; it was afterwards found as useful for planting as for digging them, and likewise is used for almost every purpose for which a hoe has been used; and they are employed to the greatest possible advantage in stony or rocky lands, and in planting new land; they are likewise used as a garden hoe, being one of the best implements a gardener can have in use, or in working between rows of vegetables, digging round young trees, loosening the ground, &c.

Lord Vernon's New Tillage Hoe. The utility of this garden hoe will be duly appreciated upon trial. Few gardeners or nursery men employed in gardening will be without them when once they have been used. They are employed to great advantage in deep tillage; in many cases they are superior to digging or forking the land.



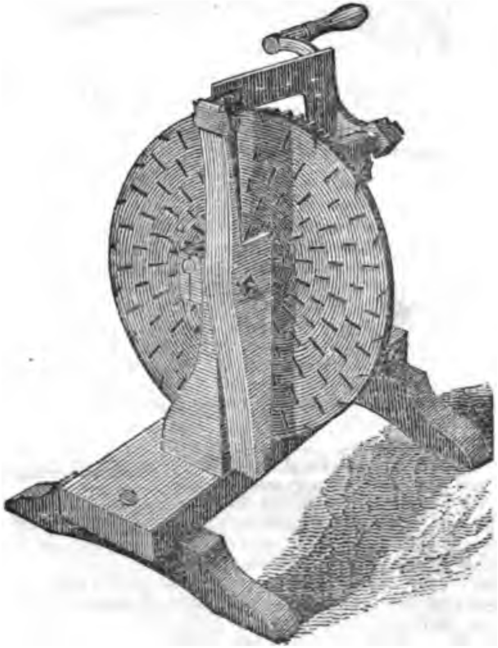
Cast Steel Shovels and Spades. Ames's improved Cast Steel back Strapped Shovels and Spades are very superior in every respect to the common iron and steel shovels. They wear much longer, continue brighter, more sharp, and are used with great ease. This article, though one of the oldest and most common implements in use, has been much improved. Also a great variety of other kinds of spades and shovels, made by different manufacturers. Irish shovels and spades with long handles.

Bill-Hook. This article is much used in England in pruning and clearing brush, and is a good tool as a substitute for the pruning saw and chisel, and can be used with more expedition.

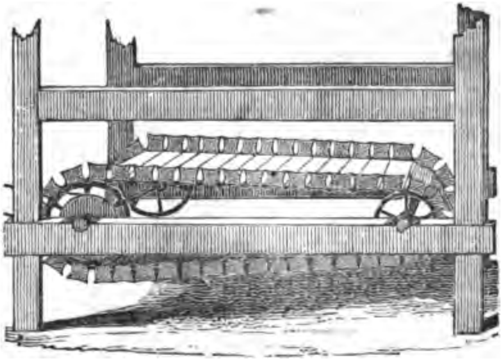


Garden and Field Rollers. E. Phinney, Esq., of Lexington, has made great and successful use of the roller for grass land, and has given a description and dimensions of what he considers the most convenient and best proportion, viz.: The rollers to be six feet in length and five feet in in diameter, placed on an iron axle of the same length by one inch and a half in diameter; the roller to be made of oak or any hard wood plank, each plank to be about four inches wide and two and a half thick; the roller is made in two parts, of three feet each; each end of the axle is secured in a frame which is made of joist, of a suitable size to receive the end of the axle; to this frame is attached the shafts in which the horse is, or a tongue to which the oxen are attached, which completes the rollers.

Mr. Phinney says, this sized roller presents the following among other advantages, viz.: If the ground is very mellow, the large sized roller presses the small stones more directly into the ground and renders the surface more regular and even; the large roller also moves easier, and the weight falling more directly upon the small stones, they are, as he has before observed, better pressed into the earth, the lumps of earth more finely broken, and the surface left much smoother. For garden rollers or gravel walks the stone or iron rollers are prepared, of different sizes



Corn Sheller. A corn sheller is one of the most convenient and labor-saving implements that the practical farmer has in use. Various machines for this purpose have been invented. The most improved and best adapted for common use are those of Harrison, with the patent vertical wheel. It can be employed in all cases for large or small-sized ears. It is very simple in its construction and durable in its operation, and no way liable to get out of order; one man can work it to good advantage, though a man to turn and a boy to feed it works it much better than one alone. In this way it will shell ten to twelve bushels per hour. They are so light and portable as to be easily removed from place to place, and one machine will serve for several families, or even the inhabitants of a small town.

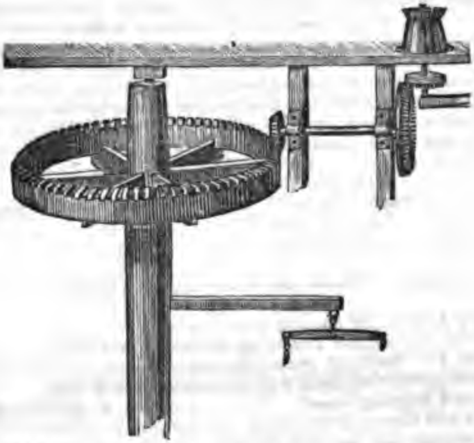


Willis's and Hale's improved Portable Horse Power, may be worked by one or more horses, mules, or oxen. As every farmer keeps more or less of these animals, no additional expense is required in working these powers. They are calculated to propel any kind of machinery or agricultural implements in common use, such as threshing machines, cider mills, corn and cob mills, straw and hay cutters, corn shellers, grindstones, winnowing machines, &c.; they are likewise well adapted for machine shops, in working the circular or web saw, turning lathes, or any machinery where power is required. The alterations and improvements made in this power render it very simple in its construction and easy in its operation, and not liable to get out of order when properly made. They occupy but the small space of nine feet by two, and are easily removed; they are truly labor-saving machines, and must come into general use with farmers and mechanics. They are likewise well adapted for the use of plantations, being calculated for working saw or roller gins, and other purposes to which they may be applied; they are so portable as to be transported at a moderate expense, and may be put in operation by any person of common capacity.

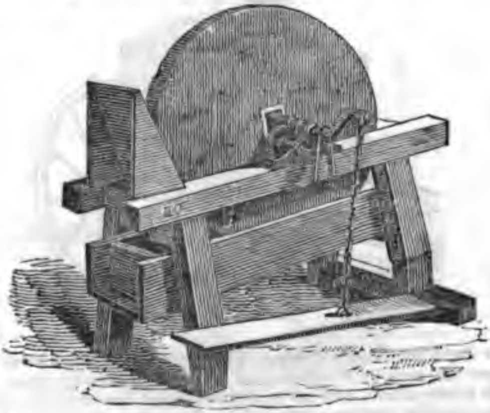
Bark or Plaster Mills. The Troy bark and plaster mills. These mills are altered and much improved from the old-fashioned mill which has been in use for many years.

Family Hand Mills. Willis's improved patent family or plantation mill, calculated for grinding corn, coffee, &c., has a small balance wheel, which regulates its operation and causes it to work free and easy.

Glass Covers for Plants. These covers are used for covering plants, protecting them in their growth and preventing mildew.



Willis's Stationary Horse Power, and Corn Cracker Attached. Corn and Cob Cracker. This mill, which is calculated for grinding cob and corn together, is found to make the best provender and the most economical food for fattening hogs or horses. It is so constructed as to be used with a common grist mill or separate, as circumstances may require, and may be worked by a single horse or any other power. From thirty to forty bushels per hour have been ground in those mills.



Grindstones on Friction Rollers. Grindstones of different sizes hung on friction rollers and moved with a foot treader, are found to be a great improvement on the present mode of hanging grindstones. The case with which they move upon the rollers renders them very easy to turn with the foot, by which the labor of one man is saved; and the person in the act of grinding can govern the stone more to his mind by having the complete control of his work. Stones hung in this manner are coming daily more in use, and wherever used give universal satisfaction. The rollers can be attached to stones hung in the common way.

Hay Knives. These knives are for the purpose of cutting the hay in the mow, and are a desirable article for that purpose, and almost indispensable where hay is stacked in the yard, and the farmer would wish to spend his hay to the best advantage.

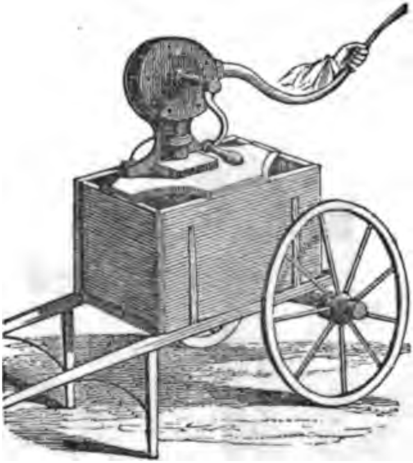
Peat Knives, for cutting peat; an article which is daily increasing in use for fuel, and in many parts of our country is found in great abundance, and if cut at a suitable season of the year, is used to good advantage.

Pomace Knives. These knives are almost indispensable in a cider country.

Ditching Knives, for ditching Low Lands.

Cast Steel Edging and Trimming Knives. These knives are calculated for edging and trimming grass-plats, borders, &c.; are found to be one of the most convenient tools a gardener can have in use.

Grass and Edgeing Shears. These shears are for the purpose of edging banks and slopes, for trimming and keeping the banks in good order, and the oftener they are used the more thrifty and thick the grass will grow.

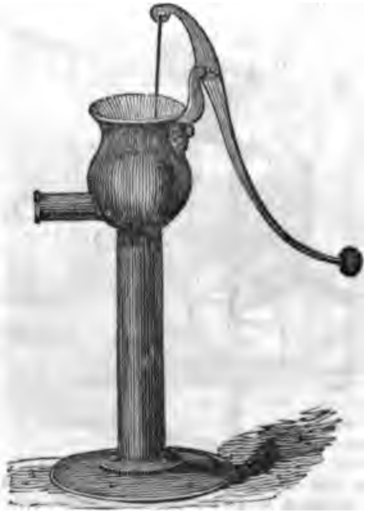


Hale's Improved Rotary Pump. This pump, which is a great improvement upon the various rotary pumps now in use, is very plain and simple in its construction, and no way liable to get out of order; but works with great facility, throws a constant and regular stream by a very simple operation of a crank, and is calculated for all kinds of domestic purposes, as well as for green-houses, factories, &c. There are different sizes of these pumps manufactured, which are so constructed as to answer as forcing pumps, in such a manner as to carry water to any distance, and are a good substitute for an engine.

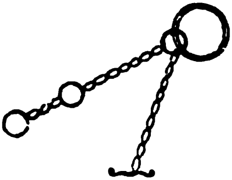
Zinc Hollow Ware, either for culinary use or the dairy, by wholesale or retail, may be had at the agricultural warehouse. The proprietors are sole agents for vending the above wares. The prices of this ware will, upon examination, be found not to vary materially from that of tin and iron, yet as durable as iron, easily cleansed, not subject to rust, giving the article cooked or kept in it no unpleasant taste, and containing in itself no poison, like copper, brass, and lead.

Zinc kettles will be found to cook rice, hominy, and all kinds of sweetmeats, better than any other kind of metal, neither discoloring nor varying the flavor of the substance cooked; and for these purposes, it will ere long be substituted for brass and copper, to avoid the poisonous corrosions of those metals.

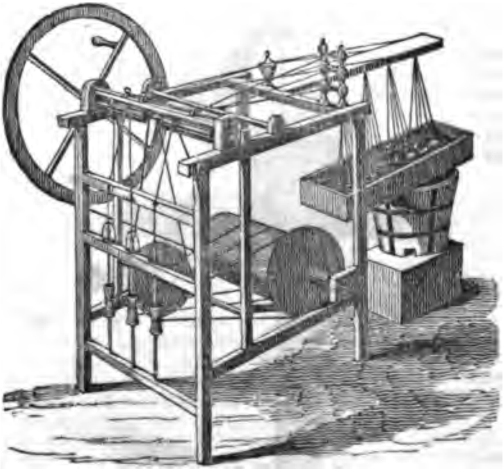
Zinc pans, for the dairy, will be found by the dairy-woman an object worthy of her attention, from these considerations: that they will greatly outlast any other pans, that the same size pans will produce one-sixth more cream or butter, and of a superior flavor; they are more easily cleansed, and will keep milk *sweet* longer by a number of hours. Zinc tubs and firkins will keep butter sweet several days longer in hot weather than those of wood or other kinds of metal. This has been a subject of experiment, and the results safely warrant the statement. Hence families who prefer sweet butter to rancid, will do well to avail themselves of these tubs, for keeping their butter sweet and retaining its flavor.



Scott, Keith, & Co.'s Improved Cast Iron Pump. This pump was invented by Jesse Reed, of Bridgewater, and proves to be the most simple and best constructed pump that is in use, being made of cast iron, which is considered the best metal which water can pass through; is very durable and cheap. It has metal boxes so constructed, that in raising the handle the lower box or valve is opened, and the water let off, which prevents its freezing. They are so plain and simple in their construction, that they can be put up or taken down by any common workman, and no way liable to get out of order. They are attached to wooden logs or lead pipes, and are well calculated for all domestic purposes.

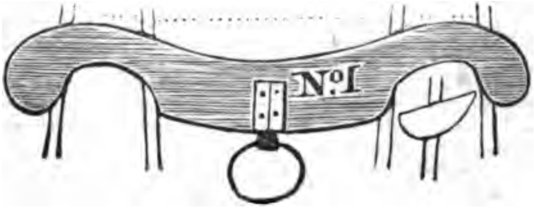


Cattle Chains. These chains have of late been introduced for the purpose of securing cattle to the stall, — are found to be the safest and most convenient mode of fastening cows and oxen in the stanchion. They consist of a chain which passes round the animal's neck, and by a ring attached to the stall plays freely up and down, and leaves the animal at liberty to lie down or rise at pleasure, and keeps him perfectly secure.



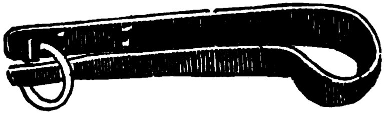
Brooks's Patent Silk Spinning Machine. Brooks's silk spinning and reeling machine, is found to be a very simple and easy operating machine, and yet one of the most perfect that has been invented for the purpose of reeling and twisting silk from the cocoons, and manufacturing it into sewing silk. By the different arrangements of this machine, it will operate upon a single or double thread, as may be required, and prepare it for twisting or weaving. Experience has fully proved, that by uniting the filaments of silk as they are drawn from the cocoons, wet in their natural glutinous substance, before they dry, the thread is more firm, smooth, and strong. The simplicity of the machine, and the very easy way in which it is used, bring it within the comprehension and capacity of any person to use it. Mr. Brooks has received a premium for his invention from several societies, and of late a premium and medal from the Scott's legacy, in Philadelphia.

Lightning Rods and Glass Blocks. From the repeated and almost daily occurrences which happen from the effect of lightning, occasioning death, and destruction of much property, it is a matter of surprise that every farmer does not have attached to his dwelling-house and barn a lightning rod, and guarded in the best possible manner, which is done by passing the rod through glass blocks which are constructed for the purpose.



Ox Yokes. Many improvements have been made in this article, and even in the bows and keys.

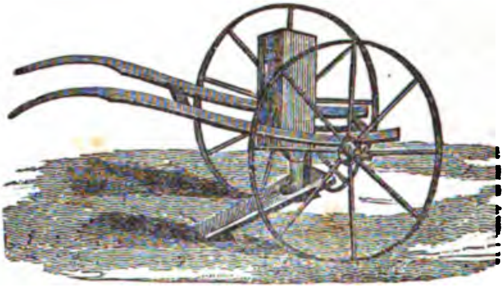
Brass and Composition Balls. These balls are not only ornamental, but are very useful in preventing the animal from hooking, or being in other respects mischievous and troublesome. They have been in very general use, and add much to the appearance of the animal.



Pomroy's Patent Spring Staple, for securing horses. The improvement in this staple, is such, that if the horse is cast, or in any way entangled, he can disengage and free himself. Many fine and valuable horses are lost for the want of this self-regulating staple.

Carriage Lifter, or levers, for raising wagons, carts, or carriages of all kinds, or for raising loads, pressing goods, &c. Being a small handy implement, it may be taken in a carriage, while travelling, and found very convenient and handy for the purpose. Carriage winches and wrenches are likewise very handy and convenient travelling companions, and should always be at hand.

Apple Parer. The apple paring machine is used to great advantage in that part of the country where much attention is given to paring and drying apples for market. This is a small simple machine, which is very convenient for the use it is designed for, and is as much of a time and labor-saving machine as those which are more expensive and complicated.



Willis's Improved Seed Sower. This machine, which was designed in the first instance for sowing small seed in gardens, is found on using to sow large as well as small seed to advantage, and proves to be one of the best field and garden implements in use. It is particularly adapted for sowing ruta baga, turnip, &c. The saving of seed in the use of this implement is quite sufficient to pay the cost of it in one season, and the seed is sown more regular and even.

Harden's Improved Seed Sowing Machine. This is one of the best labor-saving machines in use, calculated for sowing small seeds in the field or garden.

Patent Curry-Combs, and Brass Teeth Cattle Cards. Patent and common curry-combs, and cards with brass teeth. No stock farm should ever be kept without a good supply of these articles, and constant use being made of them.

Straw Splitters. This little implement, which is plain and simple in its construction, is one of the most useful implements, and should be introduced and used in every family, in town and country.

Saw and Roller Gins. Cotton gins have become the indispensable articles of the cotton planter. A new roller gin has been invented by a Mr. Whittemore, and is coming into very general use; it is readily worked by hand or horse power.

Stamps, of all descriptions, for marking and branding the farmer's tools, of which every farmer who is in the habit of lending and accommodating his neighbours and friends, as all farmers are and must be, should have every tool marked with his name. This prevents the loss of many tools, and much inquiry and trouble among neighbours.

Garden Reels and Lines. Very handy and convenient implements for the gardener, in laying out his borders, beds, alleys, &c.

Pruning Chisels and Saws. Of all the implements that are used on the farm, there are none used to so much profit and advantage as the pruning knife and saw. Too many of our fruit and ornamental trees are suffered to run to wood; from this circumstance we have less and poorer fruit.

Manure and Hay Fork. No one implement has undergone so thorough an investigation and improvement as the hay and manure fork. Since the first introduction or use of these articles, great improvement has been made in the form of them, and the quality of steel from which they are made. Among the most approved manure forks in use are those of Willis, cast steel, manufactured from one piece, in which no welding is necessary. These forks have been in common use for many years. They are so well tempered as to have that degree of elasticity, that they discharge the manure with the greatest ease; they are in no way liable to clog or foul, and are very strong and durable. Unfortunately for this article, there has been great quantities of a very inferior kind made and sold in the form and shape of the true patent ones, which, having been made of very poor steel and slighted in the manufacturing of them, has injured the use of this very useful and almost indispensable article.

Budding and Pruning Knives. A great variety of budding and pruning knives are now used, of various forms and shapes: some very superior ones.

Fruit Shears. Those shears which are attached to a pole are for the purpose of taking off fruit from the extreme branches of trees or such parts as are not to be come at conveniently in any other way. For this purpose they are found to be very convenient and useful; they are likewise used for taking off scions, &c.

Tree Scrapers. This article, which is indispensable in keeping trees in good order, should be used every season in removing the dry and hard bark from trees, to increase a quick and vigorous growth, and keep them in full bearing.

Transplanting Trowels and Forks.

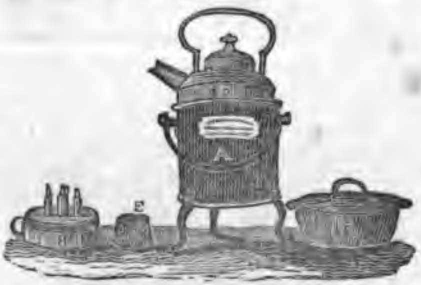
Post Augurs and Post Axes. These two implements are used for one and the same purpose, that of mortising posts.

Pickaxe. A common but very useful article, on an improved plan.

Post Spoons. With this implement and a common crow-bar, posts are set with great advantage and expedition.

Stable Door Hasps, for the purpose of securing barn or stable doors, gates, &c.

Willis's Improved Family Sausage Filler. This machine, which is intended for filling sausages, is one of the most convenient and expeditious things for the purpose that can be conceived of. One man will do more in preparing and filling sausages with this machine, than ten men can in the old manner of working them.



Fessenden's Patent Lamp Boiler and Tea-kettle. The lamp apparatus for heating water, &c. here represented, has been found very useful in small families, and such persons as may wish to prepare tea or coffee drink, cook eggs, oysters, &c., in their own apartments, without the trouble or inconvenience of a wood or coal fire. It is very convenient in public houses, coffee-houses, and other places, where it is wished to keep any hot liquid constantly on hand. Besides answering all the purposes of what is called the nurse lamp, it may be made to boil from one pint to a gallon of water, by a method which in many cases will be found the most economical and expeditious which can be devised.

Description of the Cut. — [A] Sheet iron case, in which the tea-kettle, boiler, &c. may be placed, removable at pleasure. It has a hole in the bottom, to admit the heat of the lamp to pervade the bottom and sides of the boiler. [B] Lamp with five or six wicks, more or less, placed when in use under said case. [C] Pan or boiler, which, when in use, is placed in the sheet iron case. [D] Tea-kettle in its place for boiling. [E] A small sheet iron cylinder, a little tapering, so as to form the frustrum of a hollow cone. This is occasionally placed within the case, so as to surround the hole in its bottom, in order to place upon it a coffee-pot, tea-pot, flask, tin porringer, or other small vessel, in which it may be wished to heat water.

Farnham's Improved Patent Grater Cider Mill. The improvement in this mill is in grinding, or rather grating the apples very fine, so that all the juice is pressed out; and produces a greater quantity of liquor from the same quantity of pomace. The above mills are in extensive operation, and very much approved of. They will grind two bushels of apples per minute, and are in no way liable to get out of order.

With little alteration it can be made one of the best vegetable grinders, for grinding or cutting food for animals.

Cider Presses. Presses of different descriptions to correspond with the cider mills.

Vegetable Cutter. Leavitt's improved patent vegetable cutter, for cutting ruta baga, mangel-wurtzel, turnips, &c. Cutting those kinds of vegetables is found to be very beneficial to animals, particularly to milch cows, not only by increasing the quantity, but the quality of the milk. It is a very perfect and complete machine for the purpose.

Ploughshares. Wrought and cast iron ploughshares, of all sizes, fitted and prepared in such a manner as to be at all times ready and fit for immediate use.

Patent and Common Horse Phlemes. The patent phleme is a very great improvement on the common kind, and in the hands of an experienced and careful person is used with perfect safety, and is very effectual in its operation.

Carter's Patent Guideboard. Made by branding the letters and figures on boards; when done in this manner, are more legible and durable than the usual mode of painting. A full set of letters and figures will be furnished, calculated to answer all the purposes for one town.

Directions for using the Brands. — The brands are to be heated to a cherry red, then applied to the board, and guided by a straight piece tacked on to keep them in a line. The board is then to be lightly planed over, and the white lead applied in the usual manner with a brush The black letters will not lose their brightness, for the durability of charcoal is well known. STANLEY CARTER.

FARMER'S CALENDAR.

The following calendar is intended merely as an agricultural prompter noting that certain kinds of work should be performed about the time in the year specified at the head of each article. The figures refer to the pages in this little volume, in which further directions may be found relative to the operations which the season in general demands from the diligent, correct, and careful cultivator.

"At the beginning of every month, a good farmer, whether he has or has not a book of this sort, is obliged to reflect on the work he has to perform in that month: he ought to foresee the whole at once, or it is impossible that he should make due provision for its performance. I leave it to any one to judge, if such an estimate of monthly business can be gained so easily without such an assistance to the memory as is afforded by such a calendar; and even if such a work but once in a year gives intimation of some important work which might otherwise have been forgotten, its worth must be acknowledged."*

The directions in the following pages, are intended for the New England States, or about the latitude of forty-two degrees north, and the vicinity, or a small elevation above the sea. Allowance, however, should be made for height above the sea, as well as for situation north or south of any particular latitude; but we believe it not possible to state with any near approach to precision what such allowance should be. The nature of the soil, the aspect, the exposure, the forwardness or backwardness, or what may be styled the general character of the season, are all to be regarded. We will, therefore, not claim precision, where accuracy is not attainable. "Calendars," as Loudon has well observed, "should be considered as remembrancers, never as directories."

JANUARY.

Stock. If cattle are fed with straw, it should be done with necessary attentions and limitations. The celebrated Arthur Young observed, that "the best farmers in Norfolk are generally agreed, that cattle should eat no straw, unless it be cut into chaff mixed with hay; but, on the contrary, that they should be fed with something better, and have the straw thrown under them to be trodden into dung:" and I am much inclined to believe, that in most, if not in all cases, this maxim will prove a just one. See that your cows are of the best breed Page 38. Give them roots as well as hay, and they will give you more than an equivalent in milk for their extra keep. Page 40. Provide pure water for your milch cows, and not oblige them to go a mile, more or less, after it, manuring the highway, and running the gauntlet of dogs, teams, the horse and his rider, the sleigh and its driver, with more annoyances than Bonaparte met with in his retreat from Moscow. See also that the master-beasts do not tyrannize over their weaker brethren; and if any are inclined to domineer, take them into close custody, and deprive them of the liberty of the yard, till they will give indemnity for the past, and security for the future. Cut or chaff your hay, straw, corn-tops, bottoms, &c., with one of Willis's or some other straw-cutter, to be found at Breck & Co.'s Agricultural Warehouse, No. 52 North Market street, Boston, or some other place. You may also make use of Colonel Jaques's mixture, (page 48,) without charge for the prescription. If you give your cows good hay, roots, and comfortable lodging, you may make as good butter in winter as in summer, and become rich by sending to market the product of your dairy. Pages 54, 87, 88, &c.

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* Young's British Farmer's Calendar.

FEBRUARY.

Attend particularly to cows which have calved, or are about to calve, as well as to their offspring. You know, or should know, what time your cows may be expected to produce their young, by means pointed out page 42, where you may find a receipt for those cows which need to be doctored, that they may stop giving milk. You will find observations on rearing and fattening calves, pages 54, &c. to page 61. Your ewes and lambs will now require that care and attention which is indispensable to make sheep husbandry profitable. Page 212. The way to doctor lambs to advantage is, to give good food, and a plenty of it, to their mothers. Half a gill of Indian corn a day to each ewe before yeaning, and about two quarts per day of potatoes, turnips, or other roots, when they have lambs to nurse, will make your sheep and lambs healthy, as well as their owner wealthy. But if you half starve your sheep, you will quite kill your lambs. You will continue to cut, split, and pile wood in your woodhouse, till you have enough to last at least two years. It is very bad economy to be obliged to leave your work in haying or harvesting, to draw every now and then a little green wood to cook with, which is about as fit for that purpose as a brickbat for a pincushion, or a lump of ice for a warming-pan.

MARCH.

You may sow grass seed either as soon as the snow is off the ground, or, as some say, in August or September. You may see the question relative to the time for this purpose discussed, pages 22, 24. Be sure to use seed enough, say about twelve pounds of clover and one peck of herd's grass [timothy] to the acre. Page 24. If you did not sow grass seed in autumn with winter grain, you may now sow it, and even harrow it in. Though a few plants will be torn up, the grain will on the whole receive benefit from being harrowed in the spring. Before the spring work presses hard upon you, it will be well to employ your boys, under your superintendence, to train your steers or calves and colts to the yoke, saddle, or harness; for which you may see some excellent directions, by Mr. James Walker, page 64. Top-dress winter grain. Top-dressings should not be used in the fall for winter grain, because they would be apt to make the young plants come forward too fast, and be the more liable to be winter-killed Page 178. Attend to fences, page 204, and

to drains. Page 282. By often changing the direction of your water courses, you may render your mowing even, and prevent one part from becoming too rank and lodging before the other part is fit to cut.

APRIL.

Ploughing. **Light sandy soils had better be ploughed in the spring,** and not late in autumn, lest they become too porous, and are washed away by the rains and floods of fall and winter. For general rules on this subject, see page 267, &c. It is best to sow spring wheat as soon as it can well be got into the ground. The soil and preparation should be the same as for winter wheat. Page 107. Sow barley as soon as the ground is sufficiently dry. Page 134. Sow oats. Page 131. Spring rye is cultivated in the same manner as winter rye. Page 124. Field peas as well as garden peas make an excellent crop. Page 147. Beans are also highly worth the judicious cultivator's particular attention. Page 152. Plant some potatoes of an early sort on early ground, to be used in July and August, as food for your hogs, that you may commence fattening them early in the season. Page 258. Potatoes in small quantities at a time are good food for horses and oxen, as well as most other animals, especially in spring. They will go further, if steamed or boiled, but when given raw, they are useful as well for physic as for food, being of a laxative and cooling quality. It is now about the time to sow flax, page 99, and hemp. Page 92. Every tool, utensil, &c., which will be wanted for the labors of the season, should now (if not done before) be critically inspected, thoroughly repaired, and such new ones of the best quality added as will probably be needed. We know of no place where every want of that kind can be better supplied than at Breck & Co.'s Agricultural Warehouse, No. 52 North Market street, Boston; connected with which is a seed store, where may be procured the best of seeds both for garden and field culture.

MAY.

Attend to your pastures. Do not turn cattle into pasture ground too early in the spring, but let the grass have a chance to start a little before it is bitten close to the soil. If your pastures are large, it will be good economy to divide them as stated page 285. Cleanse your cellars, as well as the rest of your premises, from all putrescent and other offensive and unwholesome substances. Plant Indian corn as soon as the leaves of the white oak are as big as the ears of a mouse. Page 25. Not only Indian corn, but peas, oats, buckwheat, and probably most other seeds, are benefited by wetting them in water just before sowing, and rolling them in plaster. Plant potatoes for your principal crop. Page 258. Sow millet. Page 137. Sow lucerne on land thoroughly prepared, and keep it free from weeds. Page 16. Declare war against insects. Page 302. The artillery for the engagement may be elder juice, or decoction of elder, especially of the dwarf kind, decoction of tobacco, quicklime, lime-water, soot, unleached ashes, strong lye, tar or turpentine water, soap-suds, &c. Dissolve about two pounds of potash, in seven quarts of water, and apply the solution to your fruit-trees with a painter's brush, taking care not to touch the leaves or buds. A lot of land well stocked with clover is wanted by every good cultivator for pasturing swine. Page 150.

JUNE.

Summer-made Manure demands attention. Most farmers yard their cows at night, through the summer; their manure should be collected into a heap, in some convenient part of the barn-yard, to prevent its being wasted by the sun and rains. A few minutes' attention in the morning, when the cows are turned out to pasture, would collect a heap of several loads in a season, ready for your grass grounds in autumn. Dress your Indian corn and potatoes, thoroughly extirpating weeds, and please to place a handful of ashes or plaster, or a mixture of both, on your hills of corn and potatoes. These substances are commonly applied before the first or second hoeing. But ashes or quicklime (which is also an excellent application for corn) will have a better effect in preventing worms if laid on before the corn is up. Be careful to save all your soapsuds after each washing, as they answer an excellent purpose when applied to fruit-trees, both as manure and as an antidote to insects. "Plaster or live ashes sown upon your pasture grounds, will not only repay a handsome profit by increasing the value of your feed, by bringing in the finer grasses, such as white clover, &c., but will greatly improve your lands for a potato fallow, and a succeeding wheat crop, whenever you may wish to take advantage of a routine of crops."

JULY.

Hay-making. Page 275. Make as much of your hay as possible in the early part of the season, as there is at that time a greater probability of your being favored with fair weather. More rain falls on an average in the latter part of summer, or after the 15th of July, than before. If the weather is so unfavorable that hay cannot be thoroughly cured, the application of from four to eight quarts of salt to the ton is recommended. In this way it can be saved in a much greener state, and the benefit derived from the salt is many times its value. Another good method of saving green or wet hay, is that of mixing layers of dry straw in the mow or stack. Thus the strength of the grass is absorbed by the straw, and the cattle will eagerly devour the mixture.

Harvesting. Page 279. The time in which your grain crop should be cut, is when the straw begins to shrink, and becomes white about half an inch below the ear; but if a blight or rust has struck wheat or rye, it is best to cut it immediately, even if the grain be in the milky state. Barley, however, should stand till perfectly ripe.

AUGUST.

Please to attend in season to preserving your sheep from the *œstrus ovis*, or fly which causes worms in their heads. Page 228. This may be done by keeping the noses of the animals constantly smirched with tar from the middle of August till the latter part of September. In order to accomplish this, it has been recommended to mix a little fine salt with tar, and place it under cover, where the sheep can have access to it, and they will keep their noses sufficiently smirched with tar to prevent the insect from attacking them. Destroy thistles, which some say may be done by letting them grow till in full bloom, and then cutting

them with a scythe about an inch above the surface of the ground. The stem being hollow, the rains and dews descend into the heart of the plant, and it soon dies. Select the ripest and most plump seeds from such plants as are most forward and thrifty, and you will improve your breeds of vegetables by means similar to those which have been successful in improving the breeds of neat cattle, sheep, &c. As soon as your harvesting is finished, you will take advantage of this hot and dry weather, to search your premises for mines of manure, such as peat, page 200, marl, page 196, mud, &c., which often give unsuspected value to swamps. Now is also a good season to work at draining. Page 282. You may drain certain marshes on your premises, which will afford you better soil than you now cultivate, cause your land to be more healthy, and the earth taken from the ditches will make valuable deposits in your cow-yard and pig-sty

SEPTEMBER.

A correctly calculating cultivator will make even his hogs labor for a livelihood. This may be done by throwing into their pens potato-tops, weeds, brakes, turf, loam, &c., which these capital workmen will manufacture into manure of the first quality. Page 181. You cannot sow winter rye too early in September. If it be sowed early, its roots will obtain such hold of the soil before winter, that they will not be liable to be thrown out and killed by frost. Page 124. It may be sowed early to great advantage in order to yield green food for cattle and sheep, particularly the latter, in the spring. Winter wheat, likewise, cannot be sowed too early in September. Page 107. Attend to the barn-yard, and see that it has a proper shape for a manure manufactory, as well as other accommodations, adapted to its various uses. Page 74. You may as well have a hole in your pocket, for the express purpose of losing your money, as a drain to lead away the wash of your farm-yard. True, it may spread over your grass ground, and be a source of some fertility to your premises, but the chance is that most of it will be lost in a highway, or neighbouring stream.

OCTOBER.

Ploughing. Page 267. Stiff, hard, cloggy land intended to be tilled should be ploughed in autumn. Fall ploughing saves time and labor in the spring, when cattle are weak, and the hurry of the work peculiar to that season presses on the cultivator. A light sandy soil, however, should not be disturbed by fall ploughing, but lie to settle and consolidate through the winter. Select your corn intended for planting next season from the field, culling fine, fair, sound ears from such stocks as produce two or more ears, taking the best of the bunch. Page 29. You will consider well which is the best method of harvesting corn, and adopt one of the methods mentioned by Judge Buel. Page 28. If the husks and bottoms of your corn, when stowed away for winter, are sprinkled with a strong solution of salt in water, (taking care not to use such a quantity of the solution as to cause mould,) and when dealt out are cut fine with a straw-cutter, they will make first-rate fodder. Do not feed hogs with hard corn without steeping, grinding, or boiling it. The grain will go much the farther for undergoing some or all of these operations; and if a due degree of fermentation is superadded, so much the better.

NOVEMBER.

In many situations it will be excellent management to rake up all the leaves of trees, and the mould which has been produced by their decay, which can be procured at a reasonable expense, and cart and spread them in the barn-yard as a layer, to absorb the liquid manure from your cattle. Likewise it would be well to place quantities of them under cover, in situations where you can easily obtain them in winter to use as litter to your stables, &c. They do not rot easily, but they serve the purpose of little sponges to imbibe and retain liquid manure, and by their use you may supply your crops with much food for plants which would otherwise be lost. Attend with diligence and punctuality to the wants of the four-footed tenants of your barn, hog-sty, &c. Do not undertake to winter more stock than you have abundant means of providing for. When young animals are pinched for food at an early period of their growth, they never thrive so well afterwards, nor make so good stock. See that you have good stalls, stables, &c., page 236; cow-houses, page 43; a proper implement for cutting hay and straw, page 48; an apparatus for cooking food for cattle and swine, page 49. You may also carry out and spread compost, soot, ashes, &c., on such of your mowing grounds as stand in great need of manure. Though some say that the best time for top-dressing grass land is immediately after haying; any time will do when the ground is free from snow, and the grass not so high as to be injured by cattle's treading on it.

DECEMBER.

Woodland. We think that cultivators may derive advantage from attending to the observations by the Hon. John Welles, relative to wood-lots, the manner of cutting them over, &c. Page 301. We advise every farmer, and his help, &c., so to treat domestic animals that they may be tame and familiar. It is said of Bakewell, a famous English breeder of cattle, that by proper management he caused his stock to be very gentle. His bulls would stand still to be handled, and were driven from field to field with a small switch. His cattle were always fat, which he said was owing to the breed as well as keep. Colts should also always be kept tame and familiar, and you may then train them to saddle or harness without danger or difficulty. Page 64. The farmer should obtain his year's stock of fuel as early in the season as possible, and before the depth of snow in the woodlands renders it difficult to traverse them by a team. You may, when the ground is frozen, cut and draw wood from swamps, which are inaccessible for cattle in warm weather. If you cut wood with a wish that the stumps should sprout, let it be after the fall of the leaf, and before the buds swell in the spring. [See Gen. Newhall's statement, New England Farmer, Vol. X. p. 230.] The Rev. Mr. Elliot wisely recommended, when bushy ground, full of strong roots is to be ditched, beginning the ditch in the winter, when the ground is frozen two or three inches deep. The surface may be chopped into pieces by a broad axe, with a long helve, and the ditch completed in warm weather. The farmer may, probably, hit on a good time for this work in December, when there happens to be no snow, and when it will not interfere with other farming business. When the season has become so severe that little can be done abroad, much may be done relative to farming operations, and other good works, by the fireside, in contriving the proper course of crops for each field, settling accounts, reading useful and entertaining books, and laying the foundation, by mental culture, for the usefulness and respectability of those who compose the *farmer's family.*

THE

NEW AMERICAN GARDENER,

CONTAINING

Practical Directions

ON THE CULTURE OF

FRUITS AND VEGETABLES;

INCLUDING

LANDSCAPE AND ORNAMENTAL GARDENING, GRAPE VINES, SILK, STRAWBERRIES, &c. &c.

BY THOMAS G. FESSENDEN,

EDITOR OF THE NEW ENGLAND FARMER.

> GOD ALMIGHTY first planted a *Garden;* and indeed it is the purest of human pleasures: it is the greatest refreshment to the spirits of man; without which buildings and palaces are but gross handy-works. BACON'S ESSAYS.

THIRTIETH EDITION.

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1857.

DISTRICT OF MASSACHUSETTS, *to wit:*

District Clerk's Office.

BE IT REMEMBERED, That on the eighteenth day of July, A. D. 1828, in the fifty third year of the Independence of the United States of America, J. B. Russell, of the said district, has deposited in this office the title of a book, the right whereof he claims as proprietor, in the words following, to wit:

"The New American Gardener; containing practical Directions on the Culture of Fruits and Vegetables; including Landscape and Ornamental Gardening, Grape-vines, Silk, Strawberries, &c. &c. By Thomas G. Fessenden, Editor of the New England Farmer.

"God Almighty first planted a Garden; and indeed it is the purest of human pleasures: it is the greatest refreshment to the spirits of man; without which buildings and palaces are but gross handy-works.—Bacon's Essays."

In conformity to the act of the Congress of the United States, entitled, "An Act for the encouragement of learning, by securing the copies of maps, charts, and books to the authors and proprietors of such copies during the times therein mentioned;" and also to an act, entitled, "An Act supplementary to an act, entitled, An Act for the encouragement of learning, by securing the copies of maps, charts, and books, to the authors and proprietors of such copies during the times therein mentioned; and extending the benefits thereof to the arts of designing, engraving, and etching historical and other prints."

JNO. W. DAVIS,

Clerk of the District of Massachusetts

TO THE

HON. JOHN LOWELL, LL. D.

PRESIDENT OF THE MASSACHUSETTS SOCIETY FOR THE
PROMOTION OF AGRICULTURE, &c. &c.

SIR,

THE compiler of the NEW AMERICAN GARDENER is happy to inscribe it to a gentleman, whose enlightened zeal, and disinterested efforts to promote the art to which it is devoted, have rendered such dedication so very appropriate. Please to accept of it, not only as a grateful acknowledgment of favours received, but a slight, though sincere, indication of the writer's high opinion of the value of your indefatigable exertions to encourage and enlighten the pursuits of the Husbandman and the Horticulturist; vocations, which, as they are first in the order of civilization, should, in every civilized country, be considered as of the first importance to the best interests of its inhabitants.

With the highest esteem,
your much obliged,
and most obedient servant,
THOMAS G. FESSENDEN.

WITH regard to the following pages, the Compiler begs leave to observe, that utility has been his sole object. He has no pride of authorship to sustain, nor new theories to establish. The work is nothing more than a humble attempt to render some service to cultivators, by collecting and condensing, from various sources, such directions, notices, and observations, relating as well to field as to garden culture, as seemed of most importance in practice.

We would here express our gratitude to gentlemen who have favoured us with articles for this work, which must not only greatly enhance its value, but, it is hoped, will atone, in some measure, for the faults and imperfections of those parts, for which the Compiler alone is responsible. The papers to which we allude have the following heads or titles, viz. "FLOWERS, ORNAMENTAL," 109; "FRUITS," 128; "LANDSCAPES AND PICTURESQUE GARDENS," 184; "SILK," 268; "STRAWBERRY," 285; and "VINE," 294. The two last mentioned articles were from the pen of the same gentleman; and that on the VINE, having been originally published in the *Massachusetts Agricultural Repository* has been republished and recommended in other scientifi journals, as forming a complete manual for the culture o the grape.

NEW AMERICAN GARDENER.

INTRODUCTION.

The importance and utility of Horticulture, or the art of cultivating those products of the soil which are used in domestic economy, require no elaborate exposition. The greatest blessings which a kind Providence can bestow on man, in his sublunary state of existence, are, health of body and peace of mind; and the pursuits of gardening eminently conduce to these. Gardening was the primitive employment of the *first man;* and the *first of men*, among his descendants, have ever been attached to that occupation. Indeed, we can hardly form an idea of human felicity, in which a garden is not one of its most prominent characteristics.

Gardening is not only an innocent and healthy, but a profitable occupation. It is not alone by the money which is *made*, but also by the money which is *saved*, that the profits of a pursuit should be estimated. Where a good garden constitutes part of a rural establishment, and the culinary uses of its productions are well understood, the field or the market furnishes a proportionably small part of the provisions necessary for family consumption. "I consider," said Dr. Deane, "the kitchen garden of very considerable importance, as pot-herbs, salads, and roots of various kinds, are useful in house-keeping. Having a plenty of them at hand, a family will not be so likely to run into the error, which is too common in this country, of eating flesh in too great a proportion for health. Farmers, as well as others, should have kitchen gardens; and they need not grudge the labour of tending them, which may be done at odd intervals of time, which would otherwise chance to be consumed in needless loitering."

Cowley says of gardening, "It is one of the best-natured delights of all others, for a man to look about him, and see nothing but the effects and improvements of his own art and diligence; to be always gathering some fruits of it, and at the same time to behold others ripening, and others budding; to see his soil covered with the beauteous creatures of his own industry; and to see, like GOD, that all his works are good."

We shall here state, concisely, some of the principal prerequisites for successful horticulture, directing our observations, chiefly, to what relates to the kitchen garden. Gardens are usually classed under the following heads:—the *kitchen garden*; the *fruit garden*; and the *flower garden.* The flower garden, being designed principally for ornament, should be placed in the most conspicuous part, that is, in front, or next to the back part of the house; the kitchen garden and fruit garden may follow in succession. With respect to the natural situation of a garden, Nicol and Forsyth agree in preferring a gentle declivity towards the south, a little inclining to the east, to receive the benefit of the morning sun. "A kitchen garden," observed Dr. Deane, "should not be situated at any great distance from the house, lest, being too much out of sight, it should be out of mind, and the necessary culture of it too much neglected." It should be placed adjoining to a stable, whence the dung may be easily conveyed into the enclosure. It should be sheltered, as much as can be, from the north and east, to prevent the blighting winds from affecting the trees. The best soil for a garden is a sandy loam, two or three feet deep, according to Forsyth; but if deeper, the better. The earth should not be of a binding nature in summer, nor retentive of rain in winter, but of such a texture that it can be worked at any season, when not frozen, without difficulty."

Dr. Deane observed, that "a garden should have a close fence, that the winds may not drive seeds of weeds into it. The fence should be at least seven feet high, and picketed to prevent the entrance of thieves. The height and closeness of the fence will increase the vegetation by increasing the warmth of the air in the garden, excepting, perhaps, the parts which are shaded by the fences. The rage of high winds will be so opposed as to prevent the tearing and distorting of tender plants, and fowls may be more easily kept out." Loudon remarks, that "the height of walls for training fruit trees, generally approved, is from ten to twelve feet but it is more commonly determined by the size and form of the garden, and the inclination of its surface." "Many low walls, or stout ranges of paling," Abercrombie observes, "will produce a greater total effect, in accelerating fruit, than the same expenditure in high walls." "Fruit walls, five or six feet high," Hitt remarks, "will do very well for peaches, cherries, vines, and figs; but he would not advise the planting of apricots, plums, or pears, on such walls, they requiring more room, and to stand longer before they bear. Garden walls have been coloured white or black, and the latter colour is justly preferred as absorbing and refracting more heat than any other, and thereby accelerating the maturity, and improving the quality of fruits."—*H. Dawes*, in *Hort. Trans.* vol. iii. p. 380.

To assist in determining the extent of a garden, Marshall observes, that *an acre*, with wall trees, hot beds, &c. will furnish employment for one man, who, at some busy times, will need assistance. Loudon says, "To give some rules for the quantity of ground to be laid out, a family of four persons, (exclusive of servants,) should have *a rood* of good-working, open ground, and so in proportion." Mr. Armstrong observes, that "The size and shape of the kitchen garden are not indifferent, but admit of no positive rules for their regulation, because depending on circumstances rarely alike in two cases—the nature of the ground, and the wants and ability of the occupier. On these heads, therefore, we only say, that a parallelogram and a square are the forms most approved, because most susceptible of a cheap, easy, and regular arrangement into beds; and that *two acres*, devoted to the culture of table vegetables, will furnish an abundant supply, for even a large family."

"The ground is next to be divided into quarters, the size of which ought to be proportioned to the extent of the garden; because, if these divisions be too small, the soil will be wasted in walks; and as the quarters are generally enclosed by espaliers of fruit-trees, the vegetables which may be planted there will not thrive, for want of sufficient exposure. The walks should, therefore, be proportioned to the size of the ground; and in a small garden, they ought not to exceed eight feet; or, if it be a large one, from twelve to fourteen feet in breadth. It will also be advisable to place a border, three or four feet wide, between such wall and the espalier, in which may be sown small salads, or any similar vegetables, that do not take deep root, or continue long in the ground. These quarters, however, ought not to be planted or sown, for raising the same crops, two successive years; and the warmest soil, or that which is next to the stable, where it is best sheltered from the cold winds, will be the most proper for hot-beds, to promote the growth of early cucumbers, melons, &c."—*Dom. Encyc.*

A copious supply of water is very essential to a good kitchen garden. Loudon remarks, that "Many kitchen crops are lost, or produced of very inferior quality, for want of watering. Lettuces and cabbages are often hard and stringy; turnips and radishes do not swell; onions decay; cauliflowers die off; and, in general, in dry seasons, all the *cruciferea* become stinted or covered with insects, even in rich, deep soils. Copious waterings in the evenings, during the dry seasons, would produce that fulness and succulency which we find in the vegetables produced in the Low Countries, and in the Marsh Gardens at Paris, and in England at the beginning and latter end of the season. The vegetables brought to the London market, from the Neat's Houses and other adjoining gardens, where the important article of watering is much more attended to than in private country gardens, may be adduced as affording proofs of the advantage of the practice.

"The contrivance for watering or washing the foliage of the wall trees in Dalmeny garden, laid out by that excellent horticultural architect, John Hay, deserves particular notice. Water is supplied to the garden from a reservoir, situated on an eminence, a considerable height above the garden walls. Around the whole garden, four inches below the surface of the ground, a groove, between two and three inches deep, has been formed in the walls, to receive a three quarter inch pipe for conducting the water. About fifty feet distant from each other, are apertures through the wall, two feet and a half high, and ten inches wide, in which a cock is placed, so that, on turning the handle to either side of the wall, the water issues from that side. The nozles of the cocks have screws on each side, to which is attached, at pleasure, a leathern pipe, with a brass cock and director; roses, pierced with holes of different sizes, being fitted to the latter. By this contrivance, all the trees, both inside and outside the wall, can be most effectually watered and washed in a very short space of time, and with very little trouble. One man may go over the whole in two hours At the same time, the borders, and even a considerable part of the compartments, can be watered with the greatest ease when required. The convenience and utility of this contrivance must at once be perceived by every practical horticulturist. The same plan of introducing water is adopted in a garden, which J. Hay planned and executed for Lord V. Duncan, at Lundie House, near Dundee; and, after the experience of several years, it has been greatly approved of. The water at Lundie is conveyed to the garden from a considerable height, and is thrown from the point of the director with great force, and to a good distance."—*Endin. Encyc.* art. HORTICULTURE.

"Vegetables that are newly transplanted, as they have their roots more or less diminished, or otherwise injured, often need watering, until they have taken new root. But this should be done with caution. If a dry season follow the transplanting, let them be watered, if they appear to droop, only at evenings, and in cloudy weather, and with water which has been exposed, one day at least, to the shining of the sun; not with water directly from a well, or a cold spring, as it will give a chill to the plants. Only a small quantity should be applied at once, that it may have an effect similar to that of a refreshing rain; for water, applied too plentifully, sometimes washes away the finest of the mould from the roots, or makes little cavities about them, which admit too much air.

"In a dry season, whole gardens sometimes need watering; and, in doing it, the above precautions should be regarded. They are happy, who have a piece of standing water in their garden, or a rivulet near at hand, from whence the garden may be watered without much labour."—*Deane.*

In laying out the compartments of a garden, Forsyth observes, "You must be guided, in a great measure, by the form and size of the garden; but do not lay them out too small, as, in that case, a great part of the ground will be taken up with walks and borders. The best figure is a square, or oblong, when the garden is of that form; but it not, they may be laid out in any other figure that is thought to be most convenient." Some of the compartments, in some of our best gardens, Neill observes, are laid out in beds four feet wide, with narrow alleys. So many alleys, no doubt, occupy a deal of room; but advantages of conveciency and neatness in enabling the workmen to clean and gather the crop, without trampling the ground, seem to compensate the sacrifice of space. For currant, gooseberry, and raspberry bushes, the compartments are, of course, reserved undivided; and narrow beds are unnecessary in the case of large perennial plants, such as artichokes or rhubarb.

Abercrombie recommends the borders next the walls to be made of prepared soil, "from eight to twelve feet wide and the same description of soil extended under the walks, in order to allow a liberal width for the roots to spread without impediment. Next to the borders, leave a space for a walk entirely round the garden, from four to six feet wide. Some persons, also, choose to have a border on the inward side of the walk, for the cultivation of espaliers, and esculents of a dwarf growth; others divide the central parts at once into main compartments or divisions. The walks or alleys must be regulated by convenience of access. Where the ground is extensive, the centre should be traversed by a walk, with parallel borders, from which cross-walks may branch, if necessary." The borders under the walls, Forsyth observes, "should, in the inside, be from ten to twenty feet wide, according to the size of the garden, to give full liberty for the roots of the trees to spread. There should be a foot-path, about two feet and a half from the wall, for the greater convenience of nailing the trees, gathering the fruit, &c. This walk should be from two to two feet and a half wide, (to admit a barrow or barrow engine for watering the trees,) and covered with sand, or, which is better, coal-ashes, about two or three inches thick, but without any gravel or rubbish below." "The borders for wall trees," according to Nicol, "should not be less than twelve feet in breadth; but fifteen or eighteen feet is not too much: that is to say, the soil should be prepared for these breadths, if it be not naturally good, and perfectly answerable for the different kinds of trees to be planted." —See further *Encyc. of Gard.* p. 474.

The above directions are mostly copied and abridged from European writers on horticulture, of established reputation. They may, perhaps, prove of use to American gardeners, though they may not apply, in their full extent to the soil, objects of culture, &c. of any individual cultivator. Useful hints may be gathered from precepts, which, taken in the aggregate, it would be the height of absurdity to be guided by It was well remarked, in a little work, lately published, entitled *Economy of the Kitchen Garden*, &c. by William Wilson, of New York, that "The word *garden*, considered in its most extensive point of view, embraces such a multiplicity of subjects, which properly come within its range, that people are very apt to enter upon the formation and cultivation of one under a very disadvantageous and erroneous impression of the impracticability of having one of any value upon a small scale; or at any thing short of a great expense and labour. Whereas, the truth of the matter is, that the most valuable part of all gardening, the raising of esculent vegetables, is an employment the most easily accomplished by those who are possessed of the hands of industry." A man may raise garden vegetables, fruits, &c. and receive benefit, as regards their culture, from books on horticulture, without possessing any of the requisites of what is technically called *a garden*.

FRUITS AND VEGETABLES,

ALPHABETICALLY ARRANGED.

APPLE.—*Preservation of apples.*—Apples keep best in a low temperature, and may be well preserved in an ice-house. An English journal recommends the use of dry pit sand for preserving pears and apples. Glazed earthen jars are to be provided, and the sand to be thoroughly dried. A layer of sand an inch thick is then placed in the bottom of the jar; above this a layer of fruit, to be covered with a layer of sand an inch thick; then lay a second stratum of fruit, covering again with an inch of sand. An inch and a half of sand may be placed over the uppermost row of fruit. The jar is now to be closed, and placed in a dry situation, as cool as possible, but entirely free from frost. Some assert that apples may be kept in casks through the winter, in a chamber or garret, by being merely covered with linen cloths. Apples, which are intended for winter's use, should be suffered to hang on the tree as long as they are safe from frost.

Cobbett says, "To preserve apples in their whole state, observe this, that *frost* does not much injure them, provided they be kept in *total darkness* during the frost, and until they be used; and provided they be perfectly *dry* when put away. If put together in large parcels, and kept from the frost, they *heat*, and then they *rot;* and those of them that happen not to rot, lose their flavour, become vapid, and are, indeed, good for little. This is the case with the Newtown pippins that are sent to England, which are half lost by rot, while the remainder are poor, tasteless stuff, very little better than the English, the far greater part of which are either sour or mawkish. The apples thus sent have every possible disadvantage. They are gathered carelessly, tossed into baskets, and tumbled into barrels at once, and without any packing stuff between them: the barrels are flung into and out of wagons; they are rolled along upon the pavements; they are put into the hold, or between the decks; and is it any wonder, that a barrel of *pomace*, instead of *apples*, arrives at Liverpool or London! If, instead of this careless work, the apples were gathered, (*a week before ripe;*) not bruised at all in the gathering; laid in the sun on boards or cloths three days to let the watery particles evaporate a little; put into barrels with fine cut straw-chaff, in such a way as that no apple touched another; carefully carried to the ship, and put on board, and as carefully landed; if this were the mode, one barrel, though it would contain only half the quantity, would sell for as much as, upon an average, taking in loss by total destruction, twenty barrels sell for now. On the deck is the best part of the ship for apples; but, if managed as I have directed, between decks would do very well. In the keeping of apples for market or for house use, the same precautions ought to be observed as in gathering and laying out to dry; and, perhaps, to pack in the same way, also, is the best mode that can be discovered.

"Dried apples is an article of great and general use. Every body knows that the apples are peeled, cut into about eight pieces, the core taken out, and the pieces put in the sun till they become dry and tough. They are then put by in bags or boxes in a dry place. But the flesh of the apple does not change its nature in the drying; and, therefore, the finest, and not the coarsest apples should have all this trouble bestowed upon them."

The following valuable observations, contained in a letter from Noah Webster, Esq. have been published in the *Massachusetts Agricultural Repository*:—

"It is the practice with some persons to pick apples in October, and first spread them on the floor of an upper room. This practice is said to render apples more durable, by drying them. But I can affirm this to be a mistake. Apples, after remaining on the trees as long as safety from the frost will admit, should be taken directly from the trees to close casks, and kept dry and cool as possible. If suffered to lie on a floor for weeks, they wither and lose their flavour, without acquiring any additional durability. The best mode of preserving apples for spring use, I have found to be, the putting them in dry sand as soon as picked. For this purpose, I dry sand in the heat of summer, and late in October put down the apples in layers, with a covering of sand upon each layer. The singular advantages of this mode of treatment are these:—1st. The sand keeps the apples from the air, which is essential to their preservation. 2d. The sand checks the evaporation or perspiration of the apples, thus preserving in them their full flavour; at the same time, any moisture yielded by the apples (and some there will be) is absorbed by the sand: so that the apples are kept dry, and all mustiness is prevented. My pippins in May and June are as fresh as when first picked; even the ends of the stems look as if just separated from the twig."

Apples, it is said, may well be preserved by packing in any kind of grain; also in paper cuttings of the bookbinder; or in shallow pits, between layers of turf, the grassy side inwards, with a sufficient covering of straw and earth to protect them from frost; likewise in dry flax-seed chaff, or pulverized plaster of Paris.

A letter from Ebenezer Preble, Esq. published in the *Massachusetts Agricultural Repository*, Vol. iv. No. i. p. 24, contains the following useful directions on this subject:—"The general method of gathering apples for cider, is, shaking the tree, and thrashing the branches with poles. The former will answer when the fruit is at maturity; they will then drop without injury to the buds. Poles should never be used but with a hook at the end, covered with cloth or matts to prevent wounding the bark; they then serve to shake the small limbs. Particular attention is required in gathering winter fruit. They should be taken in the hand, the fingers placed at the foot stalk, and, by bending it upwards, the fruit is gathered with ease, and without injury; they should be moved from the gathering baskets with great care," &c. The same writer says, "The injudicious method practised in gathering fruit, is more destructive in its consequences, than is generally understood; the blossom buds of the succeeding year are placed at the side of the foot stalk of the fruit, and if the spurs are broken, no fruit on that part will be produced."—*See further*, Fruit.

Use.—For pies, tarts, sauces, and the dessert, the use of the apple is too well known to require description. In France, bread is made consisting of one third of boiled apple pulp, baked with two thirds flour, properly fermented with yeast for twelve hours. This bread is said to be very fine, full of èyes, and extremely palatable and light. Apples, by furnishing cider, a grateful and salubrious liquor, have a tendency to diminish the consumption of ardent spirits. Besides, apples are thought to alter and ameliorate the taste and the tone of the human system, in such a manner as to destroy that artificial appetite, which is gratified by the deleterious preparations of alcohol. "The palate," says Mr. Knight, a celebrated English horticulturist, "which relishes fruit, is seldom pleased with strong fermented liquors; and as feeble causes, continually acting, ultimately produce extensive effects, the supplying the public with fruit at a cheap rate, would have a tendency to operate favourably, both on the physical and moral health of the people." In medicine, verjuice, or the juice of crab-apples, is used for sprains, and as an astringent and repellent. The good table apple, when ripe, is laxative; the juice is useful in dysenteries; boiled or roasted apples fortify a weak stomach. "Scopoli," says Loudon, "recovered from a weakness of the stomach and indigestion from using them; and they are equally efficacious, in putrid and malignant fevers, with the juice of lemons or currants." "In diseases of the breast," says Dr. Willich, *(Dom. Ency.)* "such as catarrhs, coughs, consumptions, &c. they are of considerable service. For these beneficial purposes, however, they ought not to be eaten raw, but either roasted, stewed, or boiled. They may also be usefully employed in decoctions, which, if drank plentifully, tend to abate febrile heat, as well as to relieve painful strictures in pectoral complaints."

Apples have also been recommended as food for horses and farm stock, for which purpose sweet apples are of the greatest value.—*See N. E. Farmer*, vol. v. p. 82. Sweet apples are said, likewise, to afford a saccharine matter, which is a good substitute for molasses. For this purpose the apples are ground and pressed in a cider mill, and the juice boiled immediately, the scum being taken off till it is reduced to a proper consistence.

The following process for making apple jelly has been recommended:—Pare and quarter the apples, and remove the core completely. Then put them into a pot, and place it in a heated oven, or over a slow fire. When well stewed.

squeeze out the juice through a cloth, to which add a little of the white of an egg. Boil it to a proper consistence, skimming just before it begins to boil.

APPLE-TREE.—*Pyrus malus.*—In propagating the apple-tree, the common method in New England has been to sow the pomace from late made cider, without regard to the quality of the apples producing the pomace. But we doubt very much whether this is the best mode of raising this valuable fruit-tree. The seeds for a nursery should, we think, be selected from the best varieties of apples which can be procured; and this for the simple reason that "like produces its likeness." It is as expedient to propagate from the best individuals of the vegetable as of the animal creation. In proof of this theory, we would cite the following from a communication to Dr. Mease of Philadelphia, addressed to him by Mr. Joseph Cooper, of New Jersey, an accurate observer and scientific cultivator:—

"Experience for more than fifty years has convinced me that, although seedlings from apples will scarcely ever produce fruit, in New Jersey, exactly similar to the original, yet many of them will produce excellent fruit; some will be even superior to the apples from which the seeds were taken This fact has led me to plant seeds from the largest and best kinds of fruit, and from trees of a strong and rapid growth, and to let all young trees bear fruit before grafting, which produced an uncommonly strong shoot, or large, rich looking leaf. I have seldom known them fail of bearing fruit having some good quality; at all events, they make stocks to put any good kind on, which may afterwards present itself."

Loudon observes, that "the apple, like most other hardy trees, may be propagated by seeds, cuttings, suckers, layers, or engrafting; by seeds, for obtaining new varieties, and by the other modes for continuing such as are in esteem. The seeds should be taken from fruits having the properties it is desired to perpetuate or improve in the greatest degree. In collecting seeds to sow, it must be remembered that the habits as well as the diseases of plants are often hereditary, and attention should be paid to the state of the tree from which the seeds are taken; it should be large, and of free growth, and rather in a growing state than one of maturity or decay."—*See* CUTTINGS, ENGRAFTING, LAYERS, NURSERY, ORCHARD, SCIONS, *in their alphabetical order.*

Manure for apple-trees.—Rotten leaves of trees are recommended by Forsyth as the best manure for fruit-trees, which, he says, is "much better than dung, which I by no means approve of for trees, unless it be perfectly rotten, and mixed up with mould. It is better, however, not to make use of such leaves as manure for fruit-trees unless it be perfectly rotten, and reduced to a fine vegetable mould."—*Forsyth's Treatise on Fruit-Trees*, pp. 62, 63, *American edition.*

Use.—Besides the uses to which the fruit of this valuable tree is applicable, the bark will produce a yellow colour, and the wood is used in turning and various purposes, where hardness, compactness, and variegation of colour are objects.

APRICOT.—*Prunus Armeniaca.*—The apricot-tree may be procured from the stone, like the peach; and approved sorts are perpetuated by budding, either on their own stocks or on plum stocks. They require the same sort of treatment as the peach and nectarine tree. The soil, which suits them best, is a rich black mould, according to some writers, but others recommend a light loam. "In our climate," says Dr. Thacher, "this tree should be screened from easterly and northerly winds; otherwise, it is said, they will not bear fruit, though they may grow very large. They do not attain to a bearing state so soon as the peach by one year. Some kinds ripen their fruit much earlier than others. The following are those best adapted to our climate:

The black apricot,
The Brussels apricot,
The Breda apricot,
The early apricot,
The large early apricot,
The peach apricot,
The Moor's Park apricot.
The Turkey apricot.

ARTICHOKE.—*Cynara scolymus.*—There are, according to Loudon, three varieties cultivated—conical, French, or oval artichoke, with green head. The head is oval, the scales open, and not turned in at the top, as in the globe sort. Globe, or largest, with dusky, purplish head. The scales are turned in at top, and the receptacle more succulent than the other. The dwarfish globe, a prolific variety, and valuable as occupying little room with its head. The globe kind is the only one usually cultivated in this country.

In making new plantations, select deep, rich, light loam, not liable to retain much wet in winter, nor to be very dry in summer. Let it have a gentle slope, sufficient to carry off any moisture that might lodge in the trenches between the rows, for that is more injurious to the roots in winter than the severest frost. Lay on a good quantity of rotten dung, and trench the ground eighteen inches deep, incorporating the manure well therewith, and thoroughly pulverizing the ground in digging; then proceed to slip off the young shoots from the mother stools, with all the roots and fibres they may have thrown out, and close the earth about the remaining shoots. These being provided, pull off any loose hanging leaves, and trim the fibres; then plant them with a dibble about four or five inches deep, in rows five feet asunder, and two feet apart in the row, leaving part of their green tops above ground, and the hearts of the plants free from any earth over them; be careful also to give each plant a little water to settle the earth about its roots.

Or, if you have seedling year old plants in a seed bed, you may take them up, and after shortening the tap roots a little, and dressing their leaves, plant them as above.

Subsequent culture.—"All spring and summer keep them clear from weeds, by occasionally hoeing between the plants; this, with regular waterings in the dry weather of summer, is all the culture which they require, till the season of production has terminated. They will produce some tolerable heads the same year in August, and thence till November; next year they will head sooner in full perfection. By having fresh stools planted every year or two, the old and new plantations together furnish a production of heads from June or July till November. Besides the main head, several smaller lateral heads generally spring from the sides of the stem in succession; but, in order to encourage the principal head to attain the full size, most of the side suckers should be detached in young growths, when their heads are the size of a large egg, which in that state are also prepared for some tables. As to the continuing main heads, permit them to have full growth till the scales begin to diverge considerably, but gather them before the flowers appear, cutting to each head a part of the stalk. When the entire crop on a stem is taken, cut off the stem close to the ground, to give the plant more strength for new shoots."—*Abercrombie.* "To encourage the production of large main heads, some detach all the lateral heads in a young state. These are commonly in a fit state for eating raw, having attained about one third of their proper size; and they are for this purpose frequently sold in Covent Garden market, chiefly to foreigners. Another thing practised, with the same view, is the shortening the ends of the large leaves."—*Neill*, in *Ed. Encyc.*

Winter dressing.—Abercrombie says, "First cut down all the large leaves, but without hurting the small central ones, or the new shoots. Then dig the ground between and along each row; raising it gradually from both sides, ridgeways, over the roots, and close about the plants. In rigorous frosty weather, cover also in the litter, and close about each plant." Armstrong remarks, that "various means have been employed for preserving the outstanding plants during the winter. That which is most commonly used is, after stripping off the dead or decaying leaves, and trimming down the sound ones to three or four inches, to open trenches around the plant, and to draw about it the earth furnished by these. This is again covered with long dung or stable litter, so as entirely to exclude rain, and snow, and frost. But, in making those provisions against cold and wet weather, we must not forget, that it is possible to be careful overmuch; for if the mounds of earth and litter be large and close, we expose our plants to suffocation from want of air; to exhaustion from a continued vegetation, and to scorching, from the fermentation of the covering matter, which, if the weather be wet, and but occasionally warm, seldom fails to occur.

"To obviate these difficulties, it has been proposed, that the mounds be *gradually* formed; that the first covering be merely a wrapping of long dung, and that the additions made to it be conformed to the weather, leaving openings, in all cases, on its southern side, for the purposes of ventilation, and in no case to permit the covering to exceed two feet in thickness. But even this mode of treatment is not free from objection; for, first, the direct application of the dung to the plant will always alter its flavour, and very much degrade it; and again, the capriciousness of the weather does not generally give either warning of its changes, or time to accommodate ourselves to them; they often take place in the night, and often (whether in the night, or in he day) under circumstances which prevent us from giving he plant the additional covering it may require. Two other methods, therefore, not dissimilar in themselves, have been suggested—the one to employ hollow cylinders of earthen ware, covered with a tile or piece of slate, and of capacity sufficient to embrace the plant; the other to form caps of straw, (such as are used for lodging bees,) and having a moveable top of the same material. To the last method we see no room for objection; in application it is easy, requiring no skill and but little labour, while the material and workmanship are both cheap and durable, and their property of excluding rain, snow and frost, not to be doubted."

Spring dressing.—"In spring, the litter and earth being removed in March or April, (April or May in this country,) according to the season, the stocks are examined; and two or three of the strongest or best shoots being selected for growing, the rest are removed by pressure with the thumb, or by a knife, or wooden chisel. Those shoots, or suckers, are used for new plantations. Dig the whole ground level, loosening it to the crown of the roots of every plant."—*London.*

Duration of the plants.—"Artichoke plants continue productive for several years; but, every season, some well rotted dung, or fresh sea-weed, should be delved into the ground at the winter dressing. It is certain, however, that, after a few years, the plants begin to degenerate, the heads becoming smaller and less succulent. It is therefore a general rule, not to keep an artichoke plantation beyond four, or, at most, six years. Scarcely any kind of grub or wire-worm ever touches the roots of artichokes: they form, therefore, an excellent preparative for a crop of onions, shallot or garlic. In many gardens, a small new plantation is formed every year; and in this way the artichoke season, which begins in June, is prolonged till November; those from the old stock continuing till August, when those from the new stocks come in. If the last gathered be cut with the stems at full length, and if these be stuck among moist sand, the heads may be preserved a month longer.

Seed.—"The heads, when suffered to remain ten days, or a fortnight, after the season of cutting, expand the calix leaves, and display an aggregation of jagged purple florets, producing a fine appearance. When ripe seed is wanted, those heads in flower are to be bent down, and retained in that position, so as that the calix may throw off the autumnal rains. In general, however, the seed is not perfected in our [the British] climate."—*Loudon.* Armstrong says, "Every gardener, who understands his trade, will take care to set apart a few of the finest heads of his own crop for seed; but, as the stock is upright, and the head so formed as to receive and hold water, it often happens that the seeds rot. To prevent this, the stems of the plants, so set apart, should be tied to stakes driven into the ground near them, and gradually bent, so as to give to the heads that degree of declination, that will be sufficient to carry off the water, that may fall upon them."

Use.—In England, the full heads only are eaten, always boiled. In Italy, they eat the young heads raw, with oil, salt and pepper. The stalks are eaten in France and Germany, boiled and seasoned with butter and vinegar. The flowers have the property of rennet, and have sometimes been used as a substitute for that article.

ASPARAGUS.—*Asparagus officinalis.*—*Soil.*—Asparagus ground should be light, yet rich: a sandy loam, well mixed with rotten dung, or sea-weed, is recommended.

Preparation.—A good quantity of dung trenched twelve or fifteen inches below the surface.

Propagation.—It is best to raise this plant from seeds, although the sprouts from seeds will not be fit to cut so soon by a year as from the roots. The seeds should be dead ripe, when gathered, and taken from the strongest and most compact shoots.

Quantity of seeds or roots.—If sown to transplant, for a bed four feet and a half wide by six feet in length, one quart of seed will be requisite. If sown to remain, for a bed four feet and a half wide by thirty feet in length, one pint is necessary. If plants a year old are wanted for a plantation, then for a bed four feet and a half wide by thirty feet in length, to contain four rows of plants nine inches distant in the row, one hundred and sixty plants will be requisite. The seeds may be sown as early as the season will permit in the spring, or (according to Cobbett) "three weeks, or about, before the frost sets in" in the fall—and "press the earth well down about the seed; and, as soon as the frost sets in, but not before, cover the ground with muck or litter, a foot deep, and lay some boards or poles to prevent its blowing off. As soon as the frost breaks up in the spring, take off the litter, and you will have the plants quickly up."

Asparagus beds may be from four to four and a half feet wide, with alleys of two feet in width between them. In these beds "the soil should not be less than two feet and a half deep, and, before planting a bed, it is considered good practice to trench it over to that depth, burying plenty of dung in the bottom, as no more can be applied there for eight or ten years. It can scarcely, therefore, be too well dunged; besides, though the plant naturally grows in poor, sandy soil, it is found that the sweetness and tenderness of the shoots depend very much on the rapidity of the growth; and this is promoted by the richness of the soil. Damp ground, or a wet subsoil, is not fit for asparagus. Indeed the French consider wetness as so prejudicial to this plant, that they raise their asparagus beds about a foot above the alleys, in order to throw off the rain."—*Hort. Trans.*

Method of planting.—"Stretch a line lengthwise the bed nine inches from the edge, and with a spade cut out a small trench about six inches deep, perpendicular next to the line, turning the earth displaced along by the other side of the trench; and, having the plants ready, set a row along the trench, nine inches apart, with the crown of the roots two inches below the surface, drawing some earth, just to fix them as placed. Having planted one row, directly cover them in fully with the earth of the trench, raking it back regularly an equal depth over the crown of the plants. Proceed then to open another trench a foot from the first: plant it as above; and in the same manner plant four rows in each bed. Then, lightly raking the beds lengthwise, draw off any stones and hard clods, and dress the surface neat and even. Then let the edges be lined out in exact order, allowing three feet for each alley. But sometimes, in planting large compartments of asparagus, a first trench having been made, and the roots placed as above, then a second trench is opened, of which the earth is turned into the first over the plants. So proceed in planting the whole; making allowance between every four rows for an alley of three feet [more or less]. In a dry spring or summer, water the roots from time to time, till the plants are established."—*Abercrombie.* It is of very great importance to take up the roots carefully, and expose them to the air as little as possible before planting.

If you would raise asparagus directly from seed, without transplanting, you may sow two or three seeds in the places designated above for setting the plants, and cover them with an inch of good soil. When the plants are up, they should be thinned to one in a place. Armstrong says, "the crowns of the roots must be placed upright, and the *pattes*, [or fingers,] as they are sometimes called, spread and directed downwards; for on their taking (to the food provided for them) the prosperity of the plantation will principally depend."

The following are the directions for the culture of this root, given in the *Catalogue of Seeds*, &c. for sale by John B. Russell, Boston; and, perhaps, are as much to the purpose as those which are more prolix, minute and circumstantial:

"Sown in April and May, in the same manner as onions, in rows, eighteen inches apart. Let it stand one or two years—transplant into trenches four feet wide, dug, if the soil will admit, fifteen inches deep—fill up six inches with rotten manure—place the roots fourteen inches apart."

In a *Treatise on Gardening*, by J. Armstrong, of Dutchess, published in *Memoirs of the New York Board of Agriculture*, vol. ii., it is said, "If we can postpone the use of the plant for a year or two, sowing is to be preferred, because the crop it gives, (other things being equal,) though later in coming, is more abundant, of better quality, and of longer duration; but, if our supply must be prompt, planting is best, for, by this mode, we, no doubt, soonest obtain the fruit."

The same writer directs to plant roots of *three* years old, instead of those of one or two years old, according to the usual practice; and says, "roots of three years will not only give fruit sooner than those of one, or two years, but, their fibres being harder, and roots more numerous, are better able to sustain the violence inseparable from transplantation, and the other accidents, (such as heating and chafing,) which often accompany it, particularly if the roots be brought from a distance."

Extent of the plantation.—An asparagus compartment should not contain less than a pole of ground, as it often needs this quantity to furnish a good dish at one time. For a large family, about sixteen rods are kept in a productive state, which are calculated to furnish, on an average, between two hundred and three hundred shoots every day in the height of the season.—*Neill, in Ed. Encyc.*

Progressive culture.—In the month of March or April, (during the whole existence of the plant,) the beds must be carefully forked and dressed, and kept clear of weeds. Occasional waterings are necessary, till the third or fourth year, when the plants will be sufficiently established to do without them. Permit the entire crop the two first years, and the greater part of it the third year, to run up to stalks. It is a common practice to sow onions, lettuce, &c. the two first years. Mr. Loudon, however, says, "the advantage of this practice is questionable; and, at all events, it should not be continued after the plants are in full bearing."

Asparagus beds should be completely loosened to a moderate depth, every spring, as soon as the frost is out of the ground, with a proper fork, having three short tines, six to eight or nine inches long. But care must be taken not to go too deep, so as to wound the crowns of the roots. The beds, being loosened in every part to a moderate depth. should be raked even, before the buds begin to advance In autumn, after the tops are turned white by the frost, they should be cleared off, and a layer of dung, or rich soil, an inch thick, laid over the bed. This should be done yearly, and the bed kept clear of weeds. If the bed should get too high by this management, the surface may be taken off with a spade, early in the spring, to the depth of two inches, before the young shoots are in the way. But when this is done, a thin dressing of rotten dung or compost should be laid on. This plant, according to *Deane's N. E. Farmer*, grows well in ground that is shaded. The sprouts will be very large and tender; but they will not be so early. It is not amiss to have one bed in a shady place, to supply the table, after the season is over for cutting the first.

Time of cutting.—"If you plant roots, the shoots may be cut the second year after; if seeds, they wil not be fit to cut till the third year. All the shoots, which come up before the middle of June, may be cut off without injuring the roots; after which time, the late shoots should be left to run up, and go to seed; otherwise the roots will be weakened."—*Deane*

Cutting and gathering.—"In new plantations, be careful not to begin cutting till the stools have become mature, or the third or fourth year. Likewise observe, both in old and new beds, to gather all the produce in a regular, successive order, within the proper limits of the season. As the rising shoots project two, three, four or five inches, at most, above the ground, while the top bud remains close and plump, they are in the best condition for gathering. Cut them off within the ground, with a narrow, sharp-pointed knife, or small saw, nine inches long; thrusting the knife or saw down straight, close to each shoot separately, cut it off slantingly, about three inches below the surface, with care not to wound the young buds advancing below. Observe in a new plantation, in the first year's gathering, if the shoots come up of irregular sizes, to cut only some of the larger for a fortnight, or three or four weeks, and then permit the whole to run; but otherwise, when in strong production, gather all as they come, two or three times a week, or as required during the season, till the 21st of June; then, at furthest, terminate the cutting, and permit the after-shoots to run up in stalk till October. If, from a particular inducement, you cut later than the 21st of June, be careful to leave two or more shoots to each stool, in order to draw nourishment to it; for the stools left without growing shoots will perish: and, by negligence in this respect, many vacuities or unproductive spots are left in beds."

Duration of the plantarion.—Abercrombie says, "A plantation of asparagus, under good culture, will mostly continue for ten or twelve years to afford good crops; after which the stools usually decline in fertility, and the shoots in quality; so that, to provide a permanent annual supply, some fresh beds should be planted a sufficient time beforehand, allowing four years for their advancing to a productive state."

To save asparagus seed.—"Select some of the finest and earliest heads as they make their appearance in the spring;

tie them to stakes during summer, taking care not to drive the stake through the crown of the plant. In autumn, when the berries are ripe, wash out the seeds, if for the market, or to be sent to a distance; but for home sowing, keep them in the berry till the time of sowing, the pulp being a great nourishment to the seed, which ought to be kept in a dry place during the winter."—*Hort. Trans.*

The following directions for cultivating asparagus are from the second volume of the *Memoirs of the New York Board of Agriculture.* They were furnished by Richard Treat, the oldest gardener at the Shaker village in New Lebanon, Columbia county, New York:—

"Beds should be made as soon as the ground is clear from frost—the first part of April, in ordinary seasons. The ground must be well worked to the depth of a spade blade, and intimately mixed with rotted horse-manure. The seeds should then be sowed in rows or drills, twenty inches apart, and one inch deep, the rows crosswise of the beds. They should be raked in lengthwise of the rows.

"Asparagus will be large enough to begin to cut the third spring after it is sowed. It may be cut until the 20th June every year afterwards. As soon as the cutting season is over, hoe it over lightly, so as to loosen the soil, and make the surface even. Every other year, spread on each bed an inch layer of good yard-manure before hoeing. The tops will now grow to a great size, and mostly seed well. Early in the spring, cut the dry tops close to the ground, lay them evenly on the beds, and burn them there. Then hoe the beds over, and rake them again. They are then prepared for a new growth.

"Most of the English books recommend breaking up old asparagus beds once in a certain number of years. Some of the Shakers' beds have been cut twenty-five years, and, under that course of treatment, are as good as they ever were."

Armstrong, in the treatise quoted above, says, "It has been lately asserted, and with sufficient confidence, that a pickle of salt and water, of the ordinary strength for preserving meat, may be very usefully applied to asparagus beds in the spring. The effects ascribed to it are, its stimulating power over the crop, and its tendency to destroy the seeds of weeds, and of insects lying near the surface. Experiments on this subject should be multiplied, and with pickles differing in strength and quality." In the last edition of *Deane's New England Farmer*, it is observed, "that to a bed fifty feet by six, a bushel of salt may be applied, with good effect, before the plants start in the spring."

Use.—"The esculent part is the early shoots or buds, when three or four inches high, and partially emerged from the ground in May or June. They are in great esteem in Britain, and on the continent; and this plant has, in consequence, been cultivated for an unknown period. In Paris, it is much resorted to by the sedentary operative classes, when they are troubled with symptoms of gravel or stone."—*Loudon.*

Forcing asparagus in hot beds.—The first step in this process is to procure a supply of three year old plants, for none else are fit for the purpose. Then form a hot bed, as directed under the article Hot-bed, in the alphabetical arrangement of this work. In this set the plants, at the distance of two inches. Armstrong observes, that the mode of taking the plants from hot beds "differs from that used for plants raised in the natural way. If you employ a knife, you cannot fail to destroy many young plants, (on account of the closeness with which they stand to each other,) but the mode in which you do least mischief, is, to thrust your finger down alongside of the bud, and break it off at the root."

BALM.—*Melissa officinalis.*—"The balm is a hardy perennial, with square stems, which rise two feet high or more, furnished with large ovate leaves, growing by pairs at each joint. It is a native of Switzerland and the south of France, produces flowers of a purplish colour from June to October." There is a variety with hairy leaves.

Propagation.—"It is readily propagated by parting the roots, preserving two or three buds to each piece, or by slips, either in autumn or spring."—*Loudon.*

Culture.—"Plant the slips or sets in any bed of common earth, by dibble or trowel, and from eight inches to a foot apart, giving water, if dry weather. Those of the spring planting will soon grow freely for use the same year; and afterwards will increase by the root into large bunches of several years' continuance, furnishing annual supplies from March to September."—*Loudon.*

Dried Balm.—"Gather when coming into flower, and when the leaves are entirely free from dew or moisture; then dry rapidly in the shade, or better in an oven; and when cool press the herbage into packages, and wrap them up in white paper till wanted for use. Keep the packages dry, and in a close drawer."—*Loudon.*

Use.—"Formerly the balm was held in very high estimation: Paracelsus supposed it to possess virtues, by which human life could be prolonged beyond the usual period. In modern times, however, the properties of this agreeable plant are better understood: it yields, by distillation, a small proportion of an essential oil, of a yellowish colour, and a very grateful smell. A few drops of this oil, diluted in a glass of simple water, or strong infusions of the young shoots, drank as tea, and continued for several weeks or months, have proved of service to nervous and hypochondriacal patients, of a lax and debilitated habit. Either of these liquid preparations, when slightly acidulated with lemon juice, acquire a fine reddish colour, and may be taken with advantage in dry, parching fevers, as well as in cases of distressing flatulency, attended with eructations, where the first passages have previously been opened."—*Dom. Ency.* vol. i. p. 127.

BARLEY.—*Hordeum.*—The following remarks on the cultivation of this grain are extracted from an article written by Jesse Buel, Esq., published in the *N. E. Farmer*, vol. v. p. 290:—

"*The soil* for barley should be such as will grow good turnips, or other green crops, including clovers, and which embrace the varieties of loams and sands that are not wet, or *very* dry and poor. Indeed, I have taken my crops, and they have been pretty good, from my lightest turnip soils. Barley cannot be cultivated to advantage upon stiff, heavy, and wet grounds, or on such as are of a cold and tenacious quality. This crop occupies the ground but about three months; and it is only in a dry, light, mellow soil, that its roots can extend with sufficient facility, and supply the food necessary to bring the grain to rapid and perfect maturity.

"*Previous crop.*—Crops that precede this grain should be such as leave the ground mellow, and free from weeds; and for this reason hoed crops are to be preferred, such as turnips, potatoes, peas, beans, &c. Small grains should not precede it: they impoverish the soil, leave it foul, and besides, it is contravening one of the most salutary maxims of husbandry, to grow two dry crops in succession. It may follow clover; but if the soil is heavy, the ley should be ploughed in autumn. Barley is successfully sown upon the fallows in England, (not summer, but autumn fallows,) and is sown sometimes after wheat; but in the latter case turnips are pulled, and previously fed upon the stubble—a practice which I think is not likely to obtain here. I have generally sown barley after ruta baga or potatoes, these crops having received a good dressing of long, yard or stable-manure.

"*Manure* should not be applied to the barley, but to the preceding crop. The short period that this grain occupies the ground does not afford time for the manure to decompose, and yield its food to the plants; and, if applied in excess, it causes a too rank vegetation, and the straw lodges before the grain is matured. Where a fallow or clover ley is employed, and ploughed in autumn, dung may be previously applied and ploughed under.

"*Preparation of the ground.*—Where barley follows a root or hoed crop, one ploughing will generally suffice: but in all cases a complete pulverization of the soil is necessary; and to effect this a roller is often of material benefit. If sown upon grass leys, ploughed in autumn, the spring ploughing should be shallow, so as to leave the sod reversed. But the preferable way may be to harrow the fallow, plough in the seed, with a light furrow, and smooth off with the harrow.

"*The seed, and sowing.*—Loudon enumerates six species and sub-species of the barley. The kinds uniformly cultivated here are the two, four, and six rowed spring, (*hordeum vulgare*, and *h. distichon.*) Thin-skinned, pale, plump seed should be selected. I sow as soon as the ground is sufficiently dry in spring. The young grain is not hurt by the ordinary frosts of the latter part of April and May. I sow from six to eight pecks per acre, according to the richness of the soil and the forwardness of the season; the poorest ground and the latest sowing requiring the most seed. In England the common quantity of seed is from eight to sixteen pecks. Our climate being much warmer than that of Great Britain, barley and other grains till better with us, and consequently we require less seed. We uniformly sow broad-cast, generally on the fresh furrow, and harrow in both ways; and those who have a roller use it in the finishing operation. It gives a smooth surface, breaks down the lumps, brings the earth in contact with the seed, and if grass seeds have been sown, its use is doubly beneficial. I steep my seed twenty-four hours in a weak solution of nitre, the crude kind of which costs me only eight cents per pound by the quantity. From the analysis and observations of Grisenthwaite, there is reason to believe that this salt is peculiarly beneficial to the barley crop, the grain yielding it on analysis. I have made no comparative experiments, but I think this steep serviceable. I have applied to this grain, as a top dressing, with singular success, the powdered dung of pigeons and dunghill fowls, at the rate of twenty to thirty bushels the acre.

"The crop admits of no after-culture when sown broadcast. Yet the application of the roller, when the plants are two or three inches high, is no doubt salutary, especially if there has been no considerable rains. Rolling gives a salutary compression to the soil, which in the spring is apt to be loose and porous, and full of cracks, by the alternation of freezing and thawing, or of wet and dry weather; it destroys many insects; and, above all, it partially buries the crowns of the plants, and induces a multiplication of seed stalks. I can recommend the practice from experience.—When grass seeds are sown with barley, the luxuriance of the young grass sometimes chokes the grain, robs it of nutriment, and sensibly diminishes the product. To obviate this evil, it has been recommended to sow the grass seeds after the barley has come up, and to cover them with a light harrow and the roller; and it is said, and I think with truth, that this operation will not materially injure the grain. In dry seasons, the crop is sometimes attacked by worms, while young. In this case the roller should be applied, and sufficient weight added, to require the draught of two or three cattle.

"*Time and method of harvesting.*—When the soil is rich, and the season propitious, this grain is very liable to lodge. If this happens after it has blossomed, no material injury is sustained in the product. If before, the crop is greatly diminished. This shows the danger to be apprehended from making the soil too rich and of applying fresh manure.

Barley is known to be ripe by the disappearance of the reddish cast on the ear, or what the English farmers term *red roan;* by the ears beginning to droop, and bend themselves round against the stems; and by the stalks becoming brittle, and of a yellowish colour. This is the particular period for cutting, as, if suffered to stand longer, the heads break off, and the grain wastes, with the slightest touch. And it may be cut with the cradle, sickle or sithe, according to circumstances. If it stands straight, and is not too heavy, the cradle is to be preferred; if heavy, or lodged, the sickle or sithe. But, as the grain is yet soft, and the straw contains much moisture, when it ought to be cut, it should be suffered to become well dried in the swath before it is bound in sheaves, or carried to the barn or stack. If cut with the cradle or sickle, it is bound in sheaves; but the more common practice is to cut the crop with the sithe, rake the ground, and load it with the barley fork.

"Barley improves for malting by lying till October before it is threshed; though it is often threshed immediately from the field. The great difficulty in preparing it for market is to rid it of the awns. This may be done with flails, after it has passed once through the fanning mill. And, where it is in great quantities, it may be spread from four to six inches upon the barn floor, and trodden with horses.

"*Produce and profits.*—The average product in England is stated by Donaldson at thirty-two bushels per acre. The product in New York varies from fifteen to seventy bushels, according to season and soil; and I think the average is somewhat short of that of Great Britain. Compared with wheat, its product is as two or two and a half to one; compared with oats, about equal, provided the soil is adapted to this grain. It is, however, to be remembered, that neither wheat nor oats are adapted to a barley soil; the first requiring a more stiff and tenacious, and the latter a more cold and moist location. The average price of barley is at least two thirds that of wheat: supposing wheat, then, to be $ 1 12 the bushel, and the product 15 bushels per acre, and barley to be 75 cents, and the product of an acre 30 bushels, and the expense of cultivation equal, the profits of the barley will be nearly as three to two compared to wheat. Barley, besides, is a less precarious crop, is subject to fewer diseases, and has fewer insect enemies to encounter than wheat."

A correspondent of the Bath Agricultural Society writes—'The last spring being remarkably dry, I soaked my seed barley in the black water, taken from a reservoir, which constantly receives the draining of my dung heap and stables. As the light grains floated on the top, I skimmed them off, and let the rest stand 24 hours. On taking it from the water, I mixed the grain with a sufficient quantity of sifted wood ashes, to make it spread regularly, and sowed three fields with it. The produce was sixty bushels per acre I sowed some other fields with the same seed dry; but the crop, like those of my neighbours, was very poor, not more than twenty bushels per acre, and much mixed with green corn and weeds when harvested. I also sowed some of my seed dry on one ridge in each of my former fields, but the produce was very poor in comparison of the other parts of the field."

BEAN.—*Vicia faba.*—There are two distinct species of the bean, which are often confounded by writers on agricultural subjects, to wit, *vicia faba*, garden bean, or horse bean, and *phaseolus vulgaris*, or kidney bean. The want of distinguishing between these two different genera or sorts of plants, may lead to erroneous practices, and consequent detriment to the cultivator.

The *vicia faba*, or garden bean, (often called *English bean*,) is an annual plant, rising from two to four feet high, with a thick, angular stem, the leaves divided, and without tendrils; the flowers white, with a black spot in the middle of the wing; seed-pods thick, long, woolly within, and enclosing the large ovate flatted seeds, for the sake of which the plant is cultivated in gardens. The following varieties are advertised for sale in Mr. Russell's Catalogue, viz.

- English dwarfs,
- Early mazagan,
- Sword long pod,
- Green nonpareil,
- Broad Windsor.

" These varieties should be planted as early as practicable in April."

It is said that this kind of bean is propagated to the best advantage in a stiff, moist loam, with a considerable proportion of clay. The following are Mr. Loudon's directions for its culture ·—

Quantity of seeds.—For early crops, one pint of seed will be requisite for every eighty feet of row; for main crops, two quarts for every 240 feet of row; and for late crops, nearly the same as the early.

Method of sowing.—" Plant all the sorts in rows, two feet and a half apart, for the smaller or very early, or very late kinds; and three feet for the larger; the smaller beans two inches deep, and three inches distant in the row; the larger three inches deep, and four inches distant in the row."

Transplanting.—Speechly constantly transplants his early bean crops, and considers that this plant may be as easily transplanted as cabbage, or any other vegetable. It is a practice with him to plant beans, alternately with potatoes, in the same row; the rows three feet apart, and the potatoes eighteen inches apart in the row, so that the beans are nine inches from the potatoes. The beans are transplanted, by which means they have the start and advantage of the potatoes and weeds, and, as they come in early, may be gathered before they can possibly incommode or injure the potatoes.

Manual process.—The work of sowing is most generally effected by a dibble, having a thick, blunt end, to make a wide aperture for each bean, to admit it clear to the bottom, without any narrow, hollow parts below: strike the earth fully and regularly into the holes over the inserted beans. Or the planting may be performed, occasionally, in drills drawn with a hoe the proper depth and distance as above; place the beans at intervals along the bottom of each drill, and earth them over evenly; which method, though suitable to any kinds, may be more particularly adopted in sowing the early and other small sorts.

Soaking seed in summer.—In planting late crops in June or July, if the weather be dry, it is eligible to give the beans a previous soaking for several hours in soft water; or, if they are to be sown in drills, water the drills beforehand; then directly put in the beans, and earth them in while the ground remains moist.

Subsequent culture.—" As the plants come up, and advance from four to six inches high, hoe up some earth to the stems on both sides of each row, cutting down all weeds. Repeat the hoeing as future weeds arise, both to keep the ground about the plants clean, and to loosen the earth to encourage their growth. In earthing up, great care must be taken that the earth does not fall on the centre of the plant, so as to bury it; for this occasions it to rot or fail. After earthing up, stir between the rows with a three-pronged fork. As the different crops come into full blossom, pinch or cut off the tops, in order to promote their fruiting sooner in a more plentiful production of well-filled pods."—*Abercrombie.*

Nichol says, "Topping is unnecessary for any but the early crops; being practised to render them more early." Mr. Armstrong is of opinion, that "of this practice, and of the theory on which it is founded, we may be permitted to doubt, because it does not appear to follow that, when the growth of a plant is checked or suspended in one direction, it will not exert itself in another as injuriously to the crop as any increased length of stem would have done. Every day's experience shows, that, if we pollard an apple-tree, we indeed stop its growth upward; but that, instead of sending its surplus juices to the support and enlargement of the fruit, (as this practice supposes,) it hastens to throw out lateral stems or suckers, which give no fruit whatever. Our creed, therefore, is, that, in the vegetable economy, certain juices go to the production of the stem, and certain others, more elaborated, and of a different quality, to that of flowers and fruits, and that, whether desirable or not, the art of giving to either a destination different from what nature intended, is yet to be discovered."

Gathering.—For table use, gather only such as are tender, the seeds decreasing in delicacy after they obtain about half the size which they should possess at maturity. When they become black-eyed, they are tough and strong tasted, and much inferior.

To save seed.—"Either plant some of the approved sorts early in the spring, wholly for that purpose, or leave rows of the different crops ungathered, in preference to the gleanings of gathered crops. The pods will ripen in August, becoming brown and dry, and the beans dry and hard: then, pulling up the stalks, place them in the sun to harden the seed thoroughly, after which thresh out each sort separately."—*Abercrombie.*

Use.—Mr. Cobbett says, "In England there are some sorts of this bean used for horses and hogs; but there are several sorts used as human food. It is at best a coarse and not very wholesome vegetable, yet some people like it. It is very much eaten by the country people, in England, with their bacon, along with which it is boiled." Bean flour, as Dr. Darwin observed, is probably more nutritive than that of oats, which appears by its effect in fattening hogs; and, from the relative prices of these articles, he was of opinion, that peas and beans, in general, supply a cheaper provender for horses and other animals. But as the flour of beans and peas is more oily than that of oats, it must be more difficult of digestion. Hence, when a horse has been fed with pulse, he will be less active for an hour or two afterwards, than if he had eaten oats. It will, therefore, be advisable to mix pollard or straw, finely cut, with peas and beans, before they are given to cattle.

BEAN, KIDNEY.—*Phaseolus vulgaris.*—This plant and its uses are too well known to require any description. The sorts mentioned in Russell's Catalogue, are *Kidney dwarfs, or string* :—early yellow cranberry; early Mohawk, (which will bear a smart frost without injury;) early yellow six weeks; early Canadian dwarf; early dwarf cluster; early dun coloured, or Quaker; early China dwarf; large white kidney dwarf; white cranberry dwarf; red cranberry dwarf; Warrington, or marrow; refugee, or thousand to one; Rob Roy; white cutlass bean of Carolina. *Pole or running beans* :—large white Lima; saba or Carolina; scarlet runners; white Dutch runners; Dutch case-knife, or princess; red cranberry; white cranberry; (the three last mentioned string beans;) asparagus, or yard long, *dolichos sesquipedalis.*

The following directions for the culture of the bean in gardens are from McMahon: "Towards the latter end of April, [or the fore part of May in New England,] you may plant a first crop of kidney-beans in the open ground. Select a warm, dry, and favourably situated spot, and, having dug and manured it properly, draw drills an inch deep, and two feet or thirty inches asunder; drop the beans therein, two inches apart, and draw the earth equally over them; do not cover them more than an inch deep; for at this early time they are liable to rot, if cold or wet ensue. The kinds proper to be sown now are, the early cream-coloured, speckled, yellow and white dwarfs."

Loudon gives the following directions for the culture of *runners*, or *pole-beans*, as they are commonly called in this country:—The runner kidney beans may be sown in a small portion towards the end of April, [about the middle of May in New England,] if tolerably warm, dry weather; but as these beans are rather more tender than the dwarf sorts, more liable to rot in the ground by wet and cold, especially the scarlets, the beginning or middle of May [first of June in New England] will be time enough to sow a considerable crop; and you may sow a full crop about the beginning of June. Allot principally the scarlet and large white runners. Some Dutch runners are very eligible as a secondary crop. The first crops should have the assistance of a south wall. Intermediate crops may be sown in any open compartment, or against any fence not looking north. The latest sown will continue bearing longer under a good aspect and shelter. In sowing, draw drills about an inch and a half, or not more than two inches deep. Let parallel rows be at least four feet asunder, to admit in the intervals tall sticks or poles for the plants to climb on. Place the beans in the drills four inches apart, and earth them in evenly the depth of the drills. A row contiguous to a fence or building may ascend upon lines. Some may be sown in a single row along a border, or on each side of a walk, and have the support of a slight trellis of laths and lines; or they might be arched over with similar materials to form a shady walk or bower. In a cold, wet season, or when requisite to have a few plants more forward than the general crop, some scarlets may be sown in April, either in a slight hot-bed, or in pots, under frames of hand-glasses, to raise and forward the plants, till two or three inches high: then, at the end of May, transplant them into the open garden. As the plants come up, and advance from three to six inches in growth, hoe some earth to the stems, cutting down all weeds. When they begin to send forth runners, place suitable supports to each row; and conduct the tendrils to the sticks or lines, turning them in a contrary direction to the sun. The ascending plants will soon come into flower, podding at the joints, in long succession. They are so prolific, that the returns from three sowings, in May, June and July, will last from July till October.

Taking the crop.—Gather the pods, both from dwarfs and runners, while they are young, fleshy, brittle and tender, for then they are in the highest perfection for the table; and the plants will bear more fully, and last longer in fruit, under a course of clean gathering, not leaving any superabundant pods to grow old.

To save seed.—Either sow a portion for that object, or leave rows wholly ungathered, of the main crop, or preserve a sufficiency of good pods promiscuously. The beans saved should be the first fruits of a crop, sown at a period which throws the entire course of growth into the finest part of summer. Let them hang on the stalks till they ripen fully, in August and September; then let the haulm be pulled up and placed in the sun, to dry and harden the seed, which should be afterwards cleared out of the husks, bagged up, and housed.

The pea, English bean, and kidney bean, are liable to the attacks of various insects, especially the *aphides*, [plant lice,] in dry seasons. When early crops are newly sown, or planted, mice will burrow for and eat the seed, and when it begins to penetrate the soil, it is attacked by snails, slugs, the cut worm, &c. The usual means of guarding against the ravages of insects must, therefore, be resorted to by the gardener.

As regards the field culture of the bean, we would observe, that the white kind, which is most generally approved of in New England, will produce pretty good crops, on poor, sandy, or gravelly soils; but, when planted on such ground, it is good husbandry to wet and roll them in plaster before planting. They may be planted in hills, or drills, the rows two and a half or three feet apart, according to the strength of the soil, and cultivated like other hoed crops. They may be planted the latter end of May, or beginning of June, or about the time of planting Indian corn. If planted in hills, they may be placed from fourteen to twenty-four inches apart in the rows, and the rows the distance before mentioned. Five beans are quite enough to remain in a hill. Hogs' dung, mixed with ashes, is said to be the best manure for them; and it is said to be very injurious to beans to hoe them while the dew is on, or in wet weather.

Judge Buel, of Albany, has given the following notices of some experiments, in the field culture of this vegetable:—"Beans may be cultivated in drills or in hills. They are a valuable crop, and, with good care, are as profitable as a wheat crop. They leave the soil in good tilth. The China bean, with a red eye, is to be preferred. They ripen early, and are very productive. I cultivated beans the last year in three different ways, viz. in hills, in drills and sowed broad-cast. I need not describe the first, which is a well known process. I had an acre in drills, which was the best crop I ever saw. My management was this:—On an acre of light ground, where the clover had been frozen out the preceding winter, I spread eight loads of long manure, and immediately ploughed and harrowed the ground. Drills or furrows were then made with a light plough, at the distance of two and a half feet, and the beans thrown along the furrows about the 25th of May, by the hand, at the rate of at least a bushel on the acre. I then gauged a double mould-board plough, which was passed once between the rows, and was followed by a light one horse roller, which flattened the ridges. The crop was twice cleaned of weeds, by the hoe, but not earthed. The product was more than forty-eight bushels, by actual measurement. The beans brought me one dollar the bushel last fall. The third experiment was likewise upon a piece of ground where the clover had been killed. It was ploughed about the first of June, the seed sown like peas, upon the first furrow, and harrowed in. The drought kept them back; but about 65 rods of ground, on which the experiment was made, gave a product of twelve and a half bushels. The crop was too ripe when it was harvested, and as it was cut with a sithe, I estimated that about two and a half bushels were left upon the ground. No labour was bestowed upon them from the time they were sown till they were harvested."

Forwarding an early crop.—The kidney bean is often partially forced, in hot-houses or frames, with a view to the forwarding of its produce in the open garden. Mr. Armstrong says, "In the neighbourhood of cities, the dwarf varieties are often cultivated in hot-beds, but the product is of a very inferior kind; for, of the whole catalogue of vegetables, none is more apt to take a disagreeable flavour from hot and fermenting dung (which is the basis of these beds) than the bean." It is probable, however, that beans might be forced to advantage, in hot-beds, composed of oak leaves, tanner's bark, &c. without deriving therefrom the disagreeable flavour complained of.

BEET.—*Beta.*—Among the more common varieties of this valuable vegetable are,

French sugar, or amber beet,
Mangel wurtzel,
Green—for stews or soups,
Yellow turnip-rooted,
Early blood turnip-rooted,
Early dwarf blood,
Early white scarcity,
Long blood red.

Sown from April to June. The early turnip blood beet is the earliest, and of excellent quality for summer use; the tops being good for boiling as greens. Mr. Loudon's directions for the general culture of the beet are as follow:—

"*Seed and soil.*—The beet is always raised from seed, and for a bed four feet and a half by twelve feet, one ounce is requisite. The soil in which it naturally delights is a deep, rich sand, dry and light, rather than moist. Sowing in seed beds, and transplanting, has been tried; but, though it may answer for the spinage or pot-herb beets, [white, and its varieties,] it will not answer where the object is a large, clean root.

"*Sowing.*—The beet is sown annually the last week of March, or beginning of April, [in the northern United States, the main crop should be delayed till the middle of May.] The ground on which it is sown should have been previously enriched by mellow compost and sea sand; but rank dung is not to be laid in, as it is apt to induce canker. For the long-rooted kind, trench to the depth of eighteen inches. Sow either broad-cast on the rough surface, and rake well into the earth; or, as the seed is large, sow in drills an inch or two deep and a foot asunder; or dot it in with a thick, blunt-ended dibble in rows that distance, making holes ten or twelve inches apart, about an inch and a half deep; drop two or three seeds in each hole, but with the intention to leave only one beet plant."

Mr. Mahon says, "Make choice of a piece of rich, deep ground, lay it out into four feet wide beds, push the loose earth into the alleys, then sow the seed tolerably thin, and cover it with the earth out of these alleys to about three quarters of an inch deep. Or, let drills be drawn with a hoe, near an inch deep, and a foot or a little better asunder; drop the seeds thinly therein, and cover them over the same epth as above. Or you may sow the seed on a piece of ground, rough, after being dug, and rake it well in."

Subsequent culture.—When the young plants are advanced into leaves, one, two, or three inches in growth, they must be thinned and cleared from weeds, especially those sown promiscuously, or broad-cast and in drills. If there be chasms in the rows, fill them up with the superfluous plants. The oftener the ground is stirred, during the whole course of the vegetation of the plant, the larger will be the product, and the better its quality.

As soon as vegetation is over, which always occurs after the first hard frost, take up the plants, expose them a day or two to the air, to evaporate their surplus moisture, and then house them carefully. This may be done by putting them in layers in a dry cellar, and interposing between these a slight covering of sand. In digging the roots, great care should be taken that they be not broken nor cut, as they bleed much. For the same reason, the leaves should be cut off at least an inch above the solid part of the root.

To save seed.—Either leave a few strong roots standing in the rows, or select a few, and transplant them to a spot where there will be no danger, when in flower, of being impregnated with any other variety. They will shoot up the second year, when their flower-stocks should be tied to stakes, to prevent their breaking over.

Field culture of the mangel wurtzel beet, and the sugar beet.—Soil and preparation.—The soil for these roots should be a loam, inclining to clay, in good tilth, well manured, and made fine to a good depth. John Hare Powel, Esq., corresponding secretary to the Pennsylvania Agricultural Society, in giving an account of his mode of cultivating this crop, says, "My soil was not naturally strong: it has been gradually so much deepened as to enable Wood's plough, No. 2, drawn by four oxen, to plough fourteen inches deep. Fresh barn-yard manure was equally spread upon the surface, and ploughed under in the early part of April, in quantities not larger than are generally used for potato crops in this country. Early in May, the land was twice stirred with Beatson's scarifier, harrowed, rolled; after stirred, harrowed and rolled again in the opposite direction." The soil on which Messrs. Tristram Little and Henry Little of Newbury, Mass. raised their premium crop in 1824, is a clay loam. In 1823, about three fourths of the same was sowed with onions, and manured with about 8 cords of compost manure to the acre. The other quarter was sowed with wheat without manure. In the fall of 1823, there were about 10 cords of compost manure drawn on the lot, and put in a heap. Most of the said compost was drawn from the salt marshes, when ditching the same; the other part was from the barn-yard. In the month of April, 1824, the heap was thrown over, and well mixed.

Planting.—Col. Powel says, "The holes for the seeds were made by a wheel, containing pegs in its circumference, which penetrated the ground about an inch, leaving intervals of four inches; the rows were made 2 feet asunder; two capsules were dropped into each hole; the wheel of a common barrow was passed over them, thus compressing the earth, and leaving a slight rut for the retention of moisture."

Messrs. Tristram and Henry Little observe, that, "Between the 8th and 11th of May, the land was ploughed and sowed in the following manner:—After one deep ploughing, the ground was furrowed two and a half feet apart, and the manure put into the furrows, and covered with a double mould-board plough; a roller was then passed on the top of the ridge, and the seed dibbled in with the finger over the manure, about six or eight inches apart." The quantity of seed, according to English writers, is four pounds to an acre. Mr. David Little, in obtaining a premium crop, sowed four pounds, but observed that he thought half that quantity would have been sufficient.

After-culture.—In raising Col. Powel's crop, "A small cultivator, which I had contrived for the purpose, was drawn between the rows soon after the weeds appeared; a three inch triangular hoe removed the alternate plants, leaving the others at distances varying from 8 to 12 inches asunder. The cultivator was twice used before the 20th of July. The heavy rains of August made another hoeing necessary, and surcharged the ground so much with moisture, that all roots increased much less in that month than during the same time in the two last years." The Messrs. Little, "in the course of the season, thinned their plants, and left them from 6 to 12 inches apart in the rows. They were once hoed, and ploughed three times between the rows." Mr. Powel, in raising a previous crop, had placed the rows 30 inches apart, and left the plants 6 inches apart in the rows. He says, "I this year desired smaller roots, which might grow so closely, as, by their leaves, to protect the soil as much as possible from the rays of the sun. My cultivator, by its peculiar form, enabled me to cut off the weeds when the plants were so young, that, if I had applied the plough, their crowns must have been covered in many instances, by earth occasionally falling from its land side. The failure which attends the cultivation of most root crops in drills, proceeds from the neglect of weeds in their early stages. Four or five days of delay frequently make the difference of fifteen days in the labour of making clean an acre of ground. The same weeds which a boy with a sharp shingle could remove at the commencement of one week, may, before the end of the next, require the application of an implement drawn by a horse.

"I ascribe my success, in great measure, to the use of *Wood's extraordinary plough*, which enters the soil more deeply, and pulverizes it more perfectly, than any other I have ever seen, with equal force, in any country; to the use of cultivators, which complete the production of fine tilth; to the destruction of the weeds on their first appearance—leaving the smallest space upon which a horse can walk between the rows; and, above all, to *planting the seeds of a proper kind upon a surface which is kept perfectly flat.*"

General remarks.—Agriculturists have not agreed whether it is most expedient to plant the seeds of this root on ridges or on a level. Col. Powel condemns planting on ridges in this country, as a practice not adapted to our soil and climate, in which vegetables are very liable to suffer by drought. He says, "Among the various practices, into which we have been seduced by the plausible theories of the advocates of European husbandry, there is none which appears to me more absurd than that which has led us to drill or dibble our crops on ridges. The English farmer wisely contends with the evils produced by too much rain; the American husbandman should as anxiously guard against his most formidable enemy, drought. I am inclined to think that there is no crop cultivated in this state, (Pennsylvania,) which ought not to be put on a flat surface." The climate of New England especially its northern part is not so warm and dry as that of Pennsylvania, and, in that part of the United States, perhaps the nature of the soil should decide the question, if dry, level planting, or if moist, ridge planting should be adopted."

We have heard complaints from American farmers, that the seed of this root is slow and uncertain in coming up. Perhaps the seed or soil, or both, may sometimes be too dry at the time of sowing. A writer in the *English Farmer's Journal* says, "I have of late years steeped my seed for at least forty-eight hours. I made an experiment with twenty sound seeds not steeped, twenty steeped twenty-four hours, and the same number steeped forty-eight hours; every seed of the latter produced plants, which came up two or three days sooner than either of the others, and some of those not steeped did not come up at all." Mr. Cobbett, in treating of the culture of the common garden beets, (*American Gardener*, par. 198,) directs to soak the seed four days and nights in rain water before it is sowed; and observes, that the mangel wurtzel should be cultivated in the same manner as the other kinds of beets. American writers, so far as we have observed, give no directions for soaking the seeds of this vegetable before planting; and it is possible that the omission of this part of the process may cause the slowness and uncertainty of vegetation complained of. The capsule, or husk, which contains the seeds, is dry, and it requires a long time for the moisture, which it may derive from the earth, to penetrate this integument, so as to cause the seed to sprout. But if the soil be very moist at the time of sowing, soaking the seed had better be omitted.

Much has been written and said on the subject of stripping these plants of their leaves for feeding cows and other economical purposes. An English writer observes, that six or seven crops of leaves and stocks may be taken off during the growth of the root; women and children can take off the leaves, which is done as follows:—They should place their hands on each side of the root, at the foot stalks of the leaves, leaving about six of the smallest central leaves between the fore-finger and thumb of each hand, (the small leaves are to be left on the root to grow, to make a fresh top;) then, spreading the hand flat with their face downwards, push them both at the same time towards the ground;

and thus, by one motion, will the whole of the top of each root, except the small leaves to be left to form a fresh head. be removed without unsettling the root or its fibres, which would check its growth. Some affirm, that stripping the plant of its leaves is no injury to the root, and others are of opinion that the root is injured by this means. We have doubts, whether, in field cultivation, it will often be deemed expedient to expend time and labour in this manner. The thinnings, or superfluous plants, however, should be preserved, as they make excellent food for milch cows or store swine.

Some cultivators affirm, that it is never worth the trouble to transplant these roots to fill vacancies. "I have seen," says an English writer, "much labour and expense employed in transplanting into vacant spots, when the seed has been dibbled thick enough, but have never seen the transplanted roots worth half the trouble; the tap root being broken in the drawing, nothing but the top, and useless rough roots and fangs are produced. It has been remarked by other writers, that the most common cause of failure in transplanting this root is the taking of them up when too small, before the plants have obtained strength and size sufficient to bear the operation of transplanting.

Use.—The following remarks are from a paper communicated to the trustees of the Massachusetts Agricultural Society, by J. Lowell, Esq. president of said society. They are derived, principally, from a French publication, by the Abbé Rosier:—

"This root is very little affected by changes of weather. It is attacked by no insect; drought affects but little its vegetation. It prepares the land extremely well for other crops. It may be sown and treated precisely like the common beet, except that it ought to stand eighteen inches asunder.

"In good land, they often weigh nine or ten pounds, and are stripped eight or nine times. In a light, sandy, but well manured soil, they sometimes weigh fourteen and even sixteen pounds each!

"The first crop of leaves in France is taken off in the latter end of June, or the beginning of July. In this country, probably, the latter period would be preferable. The lower leaves, those which incline towards the ground, are those which are taken away, and care must be taken to preserve the top leaves, or the crown of the plants. The leaves may be taken off every fifteen days after the first gathering. Oxen, cows and sheep devour them greedily, and fatten readily upon them. All domestic poultry eat them readily, when chopped fine and mixed with grain. Horses will feed upon them very well, mixed with chopped straw. Hogs also fatten upon them.

"Cows fed upon this root, solely, give a greater quantity of milk and cream, and of better quality for the first fifteen days, after which they grow too fat, and the milk lessens. The food of cows must therefore be varied. Oxen and sheep fatten very well upon them. Cows should have grass in proportion of one third to the beet leaves, or every third day they should be turned to grass. In this mode their milk will be excellent. The trouble of gathering the leaves is less than that of gathering any other green fodder. It may be done by children, while men are required to cut other green food for cattle. It is the surest crop, since the plant will stand the largest droughts. The roots are gathered and treated like those of the common beet. The skin is very tender, and care should be taken to handle them so as they may not be wounded, as they will, in that case, not keep so well. In order to preserve the seed in purity, care must be taken to change the ground in which the seed-beets are planted. The seed can be preserved, after it is gathered, three or four years, without injury. In giving these roots to cattle for food, they are first washed, and then cut up into pieces about the size of a nut. It is always best to accompany them, when given to horned cattle, with clover, or other hay or straw, and if the hay or straw has been previously cut fine, it will be preferable. If horses are fed with this root, with a proportion of hay or cut straw, (half of each,) they will be fat, vigorous and healthy. If they are worked severely, a little oats or corn may be added. It is thus they are treated in Germany, where this root stands in the stead of meadows or grass lands, and whose excellent horses are well known.

"Hogs, fed upon them raw, after they have been cut up fine and mixed with milk or other drink, fatten as well upon them as upon boiled potatoes, by which the fuel and trouble of boiling is saved.

"As to the quantity given to animals, much will depend on the proportion of other fodder, which you allow them. Cows fed twice a day in winter upon eighteen pounds of these roots at each time, together with four pounds of hay or chopped straw, will give as much and as good milk as in summer, and they will be kept in the best possible state."

"Oxen fed with forty weight of these roots per day, with ten pounds of hay, for one month, and after that with fifty weight per day of the roots alone, will be fat enough for sale in two months more.

"Any person disposed may, from the facts above stated, calculate how many cattle will be supported by a single acre of land on which this plant is cultivated.

"Men can eat this vegetable throughout the year; it is agreeable and healthy. No insect attacks it, and it suffers but little from the variety of the seasons. The leaves of this plant form alone an excellent food for every species of domestic quadruped, during four months in the year. Turnips and other vegetables are, besides, liable to be destroyed by insects, whereas this beet is not. The roots can be preserved eight months in a sound state, while turnips are of little value after March. In some soils turnips will not grow, particularly in those which are very stiff or strong. The root of scarcity grows every where. The milk of cows fed on turnips has a bad taste. That of those fed on this plant is excellent, as is also the butter made from it. This forage on green fodder comes also at the hot seasons, when almost all other green food is scarce, and sometimes not to be procured. Cattle never get tired of it. In many parts of Germany, where it is raised with success, they prefer it to every thing else to fatten those large herds of cattle which they annually export to France. In feeding cattle with beets, the same dry food must be given which is usually given with turnips."

Col. Powel observes, "My neat cattle prefer mangel wurtzel to any roots which I have offered to them. I have found its effects in producing large secretions of *good* milk very great. I selected, in November, two heifers of the same breed, and very nearly of the same age, and in similar condition; they were fed in adjoining stalls, and have been fed, regularly, three times a day, by the same man. One of them has had three pecks of mangel wurtzel and four quarts of corn meal, daily; the other, four and a half pecks of mangel wurtzel. The last, which has had mangel wurtzel alone, is in the condition of good beef; the other is not more than what graziers call half fat.

"The application of mangel wurtzel as food for sheep is not the least important of its uses. Ewes yean usually at the season when grass cannot be supplied. The health of themselves, and the thrift of their lambs, essentially depend upon succulent food being had. I am inclined to think, that no small portion of the success which English breeders have met, is to be ascribed to the large stores of roots, which they always have at command. It cannot be denied, that Indian meal will, of itself, in most cases, produce extraordinary fatness, as well as great size; but I have been led to believe, that diseases are early engendered by this species of forcing, which is always expensive, and, too often, eventually destroys the animal which has been thus reared."

A writer in the *Farmer's Journal* says, "This root is now generally allowed to stand eminent for the excellence of its fattening qualities. Among our field productions, parsnips and carrots may justly be declared more nutritious, Swedish turnips, as holding divided empire with it; while white turnips and cabbages sink into insignificance before it. The taste, both of the leaf and root, is most grateful to every description of stock: bullocks, sheep and hogs instinctively lay hold of them, and, when once accustomed to their flavour, they reject every other sort of green food, if they have the election.

"No edible root has yet been brought into use, which has an affinity to the one under consideration, with respect to its imperishable properties. The white turnip is in March entirely divested of its fattening power; the Swede in May becomes shrivelled, and is almost refused by cattle; the potato, after this time, entirely sprouts away all its vigour, diminishes in bulk, and dries up; but not so the mangel wurtzel. It is not only ready for use in the autumn, the winter, and spring, but may, if required, be continued with unabated advantage, and, in the following autumn, it will be found in full possession of its most valuable qualities, undiminished in weight, and abounding in saccharine juices." It has, however, been thought by cultivators in this country, that the ruta baga is more easily preserved, and will remain useful to a later period in the spring and summer after its growth, than the mangel wurtzel.

Messrs. T. and H. Little observe, as to the value of the roots for feeding stock, "there is a variety of opinions; but, from a number of years' experience, we think them a valuable addition, and highly worth cultivating. Comparing them with English hay,—and we know of no better standard—in our opinion, three tons of mangel wurtzel, or potatoes,—of the two, we value the mangel wurtzel the highest,—are equal to one ton of hay, for feeding stock generally; but for milch cows, we think two tons of equal value; for feeding store swine, mangel wurtzel is the only root, that we know of, which we can cultivate and feed to profit. Six bushels of raw mangel wurtzel we think equal to one bushel of Indian corn."

Quantity to an acre.—The premium crop of the Messrs. Little was 33 tons 10 cwt. and 14 lbs. on an acre. Col. Powel enclosed certificates to the president of the Penn. Agr. Society, showing that sixteen hundred and thirty-four bushels of mangel wurtzel, weighing seventy-eight thousand four hundred and forty-eight pounds, were produced upon one acre and fourteen perches; and a part of the same field, containing thirteen contiguous rows, produced at the rate of two thousand and sixty-five bushels per acre, weighing 44 tons, 5 cwt. and 27 lbs. In Great Britain, it is said that upwards of sixty tons have been raised on an acre.

Gathering and preserving.—In gathering the roots, care should be taken to cut off the leaves about half an inch above the crown, as they will not keep so well, if cut more closely. Messrs. Tristram and Henry Little say, "As to the best mode of preserving them, we have tried divers ways,—by pitting them, by putting them into a barn, and covering them with hay, and by putting them into the cellar; the last mode we think the best." Col. Powel observes, that one of his crops was "piled in a cellar, in rows, as wood, and covered with sand." A writer in the *English Farmer's Journal* observes, that he has practised, with success, the following mode of preserving this root:—"I pack it in long heaps, about seven feet wide at the bottom. I begin by forming the outsides with the roots, not stripped of their tops; tops outwards; the internal parts to be filled with roots without leaves; continue one layer over another, until the heap is about six feet high, and about two feet broad at top, which may be covered with straw and earth; the ends of the heap should be covered in the same way; the leaves form an efficient covering against rain and frost."

Mr. M'Mahon's mode of preserving beets, and other roots, is as follows:—"Previous to the commencement of severe frost, you should take up, with as little injury as possible, the roots of your turnips, carrots, parsnips, beets, salsify, scorzonera, Hamburg or large-rooted parsley, skirrets, Jerusalem artichokes, turnip-rooted celery, and a sufficiency of horse-radish, for the winter consumption; cut off their tops, and expose the roots for a few hours, till sufficiently dry. On the surface of a very dry spot of ground, in a well sheltered situation, lay a stratum of sand two inches thick, and on this a layer of roots of either sort, covering them with another layer of sand, (the drier the better,) and so continue layer about of sand and roots till all are laid in, giving the whole, on every side, a roof-like slope; then cover this heap or ridge all over with about two inches of sand, over which lay a good coat of drawn straw, up and down, as if thatching a house, in order to carry off wet, and prevent its entering the roots; then dig a wide trench round the heap, and cover the straw with the earth so dug up, to a depth sufficient to preserve the roots effectually from frost. An opening may be made on the south side of this heap, and completely covered with bundles of straw, so as to have access to the roots at all times, when wanted either for sale or use.

"Some people lay straw, or hay, between the layers of roots, and immediately on the top of them; this I do not approve of, as the straw or hay will become damp and mouldy, and very often occasion the roots to rot, while the sand would preserve them sweet and sound.

"All these roots may be preserved in like manner in a cellar; but in such a place they are subject to vegetate and become stringy earlier in spring. The only advantage of this method is, that in the cellar they may be had when wanted, more conveniently during winter, than out of the field or garden heaps.

"*Note.* All the above roots will preserve better in sand than in common earth; but when the former cannot be had, the sandiest earth you can procure must be dispensed with."

BENE PLANT.—*Sesamum.*—This was introduced into the Southern States by the negroes from Africa. It abounds in many parts of Africa. Sonnini and Brown, travellers in Egypt, say it is much cultivated there for the purpose of feeding horses, and for culinary purposes. The negroes in Georgia boil a handful of the seeds with their allowance of Indian corn. Probably no plant yields a larger proportion of oil, which Dr. Cooper of Philadelphia has pronounced equal to the finest oils. But it is worthy of cultivation in the Northern States, principally, as a medicinal plant. A gentleman in Virginia has given Messrs. Thorburn & Son the following account of its virtues:—"It requires to be sown early in April, at a distance of about one foot apart. A few leaves of the plant, when green, plunged a few times in a tumbler of water, make it like a thin jelly, without taste or colour, which children afflicted with the summer complaint will drink freely, and is said to be the best remedy ever discovered. It has been supposed, that (under Providence) the lives of three hundred children were saved by it last summer in Baltimore, and I know the efficacy of it by experience in my own family." This plant will throw out a greater profusion of leaves by breaking off the top when it is about half grown.—*Russell's Catalogue.*

BORECOLE.—*Brassica oleracea.*—The borecole contains several sub-varieties, the common characteristic of all which is an open head, sometimes large, of curled or wrinkled leaves, and a peculiar, hardy constitution. There are fourteen varieties enumerated by Loudon. Those which he says are the most valuable, are the green borecole, Scotch kale, or Siberian borecole, the purple or brown kale, the German kale, German greens, or curlies.

Propagation.—All the sorts are propagated by seed; and for a seed bed four feet by ten, Abercrombie says, one ounce of seed is necessary. M'Mahon directs to "sow towards the end of March [about three weeks later in New England] a first crop of borecole for autumn service," and observes—

"There are two principal sorts, the green and the brown, both very hardy plants, with tall stems, and full heads of thick fimbriate, curled leaves, not cabbaging, and are desirable open greens for winter, &c. Let this seed be sown in an open exposure, distant from trees, and from close fences, as, in such situations, they are apt to draw up too fast, with long, weak stalks; sow it broad-cast, and rake it in." Several crops may be sown in several successive months, from the middle of April to the middle of September. In dry weather, water the plants occasionally, both before and after they are up. "When about three inches high, it will be proper to thin the seed bed, and prick out a quantity therefrom, at four inches distance, that the whole may obtain proper strength for final transplanting.

"When the plants are set in the places, where they are to complete their growth, they should be planted out like cabbages, at three feet distance every way, and afterwards be kept free from weeds, and the earth drawn to their stems as they advance in growth. Those intended for winter use should not be planted in a rich, fat loam, as there they would become too succulent, and consequently could not bear the frost as well as if growing on a gravelly soil. Such as are designed for autumn use, may be planted in any convenient bed that is tolerably rich.

"The green and brown curled borecole, being very hardy, will require little protection [against the cold of winter]. In November they may be taken up, and planted in a ridge tolerably close together, and, during severe frost, be covered lightly with straw; this will preserve them sufficiently: and during winter the heads may be taken off as they are wanted for use: the stems, if taken up and planted in rows, as early in March as the weather will admit, will produce abundance of the most delicious sprouts.

"In the Southern States, and even in warm soils and exposures in the Middle States, borecole will stand the winter in open beds, without any covering whatever."—*M'Mahon.*

Use.—The crown or centre of the plant is cut off, so as to include the leaves which do not exceed nine inches in length. It boils well, and is most tender, sweet and delicate, provided it has been duly exposed to frost.—*Loudon.*

BORER.—*Saperda bivitata.*—An insect that injures apple-trees, &c.—*See* INSECTS.

BROCCOLI.—*Brassica oleracea.*—There are several varieties of broccoli, which are all merely late-heading varieties of the cauliflower. Miller mentions the white and purple broccoli, as imported into England from Italy; and it is thought that from these two sorts all the subsequent kinds have arisen, either by accidental or premeditated impregnations. The kinds introduced into this country are, the early white, early purple, and large cape.

The seeds of broccoli should be sown in New England about the latter end of May, or beginning of June; and when the young plants have germinated eight leaves, they should be transplanted into beds. By this management, towards the latter end of July, they will be fit to be planted out in some well sheltered piece of ground, at the distance of a foot and a half in the rows, and two feet between each row.

The soil proper for broccoli is rather light than heavy. M'Mahon says, the early purple broccoli, if sown early in April, and planted out as you do cabbage, in good rich ground, will produce fine heads in October or November, very little inferior to cauliflowers, and, by many, preferred to them: the white will not flower so early, and, in the Middle and Eastern States, must be taken up in November, and managed as directed in that month, [see "*preserving cabbages*," &c. under the article CABBAGE, in the following pages,] by which a supply of this very delicious vegetable may be had, in great perfection, during all the winter and spring.

"In such of the Southern States, as their winters are not more severe than in England, they will stand in the open ground, and continue to produce their fine flowers, from October to April. In the Middle, and especially the Eastern States, if the seeds are sown early in March on a hotbed, and forwarded as is done with cauliflowers and early cabbage plants, and planted out finally in April, it would be the most certain method of obtaining large and early flowers."

Insects and diseases.—"In old gardens, infested, as is often the case, with an insect which in summer insinuates itself into the roots of all the *brassica* tribe, and causes the disease called the *club*, trenching the ground deep enough to bring up four or six inches of undisturbed loam or earth, will probably bury the insects too deep for mischief, and provide fresh ground for the benefit of the plants. In gardens much exhausted by reiterated croppings, if this mode cannot be adopted, a good quantity of fresh loam from a common field, dug in, would materially improve the broccoli, and be of lasting use in future crops. Broccoli, in general, succeeds best in a fresh, loamy soil, where it comes, I think, more true in kind, and is hardier without dung; but if this situation cannot be had, deep digging, with plenty of manure, is the only remaining alternative to produce good crops. I believe soap ashes, dug into the ground in considerable quantities, to be a good preservative from the club; and if the roots of the plants, just previously to planting, are dipped and stirred well about in mud of soap ashes with water, its adherence will, in a great measure, preserve them from attack; perhaps a mixture of stronger ingredients, such as soot, sulphur, tobacco, &c. would be still better."—*Hort. Trans.* vol. iii.—*See* CABBAGE.

Wood, a writer in the *Caledonian Horticultural Memoirs*, says, he has paid a considerable degree of attention to the culture of broccoli, and has made considerable progress therein. He found that manuring with a compound of sea-weed and horse-dung produced the largest and finest heads he had seen for many years.

Culture without transplanting.—"M'Leod grows cape broccoli, in a very superior manner, without transplanting. In the end of May, after having prepared the ground, he treads it firm, and, by the assistance of a line, sows his seed in rows two feet apart, dropping three or four seeds into holes two feet distant from each other in the row. When the seeds vegetate, he destroys all except the strongest, which are protected from the fly by sprinkling a little soot over the ground; as the plants advance, they are frequently flat hoed until they bear their flowers; they are once earthed up, during their growth. A specimen of broccoli, thus grown, was exhibited to the Horticultural Society; the head was compact and handsome, measuring two feet and nine inches in circumference, and weighing, when divested of its leaves and stalks, three pounds; the largest of its leaves was upwards of two feet long. M'Leod adopts the same mode in the cultivation of spring-sown cauliflowers, lettuces, and almost all other vegetables, avoiding transplanting as much as possible."—*Hort. Trans.* vol iv p. 559.

To save seed.—Wood, already mentioned, selects the largest, best formed, and finest heads, taking particular care that no foliage appears on the surface of the heads; these he marks, and, in April, lays them by the heels in a compound of cleanings of old ditches, tree leaves, and dung. When the head begins to open or expand, he cuts out the centre, leaving only four or five of the outside shoots to come to seed. Lifting, [taking up,] he says, prevents them from producing proud seed, as it is called, or degenerating.—*Caled. Hort. Mem.* vol. ii. p. 267. Abercrombie says, broccoli seeds degenerate in this country, [England,] and that the best seed is obtained from Italy. —*Loudon.* The common directions are, in substance, as follow:

Reserve a few of the largest heads of the first crop, stripping constantly off all under shoots, leaving only the main stem to flower and seed, and tie them to strong stakes, to prevent their being broken by winds and heavy rain. Care should be taken, that no other sort of cabbage is suffered to go to seed near them.

Use.—The same as the CAULIFLOWER, which see in its alphabetical order.

BRUSSELS SPROUTS.—*Brassica oleracea.*—The Brussels sprouts produce an elongated stem, often four feet high, from which sprout out shoots, which form small green heads, like cabbages in miniature, each being from one to two inches in diameter, and the whole ranged spirally along the stem, the main leaves of which drop off early. The top of the plant resembles that of a Savoy, planted late in the season; it is small, and with a green heart of little value. Van Mons says, (*Hort. Trans.* vol. iii.) "If this vegetable be compared with any other, which occupies as little space, lasts as long, and grows as well in situations generally considered unfavourable, such as between rows of potatoes, scarlet runners, or among young trees, it must be esteemed superior in utility to most others." Nicol considered it deserving a more general culture in Scotland.

Use.—The sprouts are used as winter greens; and at Brussels they are sometimes served at table, with a sauce composed of vinegar, butter and nutmeg, poured upon them hot, after they have been boiled. The top, Van Mons says, is very delicate when dressed, and quite different in flavour from the sprouts.

Culture.—The plants are raised from seed, of which an ounce may be requisite for a seed bed, four feet by ten feet. Van Mons, in the paper already referred to, says, "The seed is sown in the spring, under a frame, so as to bring the plants forward; they are then transplanted into an open border with a good aspect." By thus beginning early and sowing successively till late in the season, he says, "we contrive to supply ourselves in Belgium with this delicious vegetable full ten months in the year; that is, from the end of July to the end of May." The plants need not be placed at more than eighteen inches each way, as the head does not spread wide, and the side leaves drop off. In this, as in every other respect, the culture is the same as that of the borecole.

Gathering the crop.—Morgan says, the sprouts must have some frost before gathered; but this Van Mons assures us is an erroneous opinion. In Belgium, the small cabbages are not esteemed if more than half an inch in diameter. It is usual to cut off the top about ten or fifteen days before gathering from the stem. In spring, when the sprouts are disposed to run to flower, their growth is checked by taking up the plants, and setting them in the ground in any shaded spot.

To save seed.—Van Mons says, it is usual to save seeds indiscriminately from plants which have and those which have not been topped; but that he intends to save from the tops only, hoping thereby to improve the progeny. Whatever mode be adopted, the grand object is to place the plants where they will be in no danger of receiving the farina of any other of the *brassica* tribes.—*Loudon.*

BUCKTHORN.—*Rhamnus.*—There are many plants of this genus; but we shall take notice of but one species, principally on account of its use in forming hedges. The kind used for that purpose is the *rhamnus catharticus*, or purging buckthorn. It is common in a wild state in England and other parts of Europe, as well as in the United States. Gen. E. H. Derby, of Salem, Mass. has cultivated this plant, and is, we believe, the first person who applied it to the very important use of forming hedges; for which purpose it is said to be much preferable either to the hawthorn or crab, principally on account of its being entirely free from the *borer*, (an insect which frequently destroys the hawthorn,) as well as all other annoyances of a similar nature. A letter from Mr. Derby to the editor of the *N. E. Farmer*, published in that paper, vol. iii. p. 214, contains the following notices of this shrub:—

"You will perceive that Miller represents it as a shrub growing about 12 or 14 feet high. The tree from which my plants were raised, formerly stood in the garden of the venerable Dr. Holyoke of this place, who used the berries for medicinal purposes, and was as large as any of our common apple-trees. He assures me he was induced at last to cut it down, as it shaded so much of his garden. I was so pleased with the healthy and clean appearance of the tree, and the next spring observing several young plants in the adjoining garden belonging to my brother, raised from seed dropped in the autumn, that I was induced to transplant them to a nursery, where they grew with great rapidity.

"After trying several kinds of trees, for the purpose of making a hedge, without much success, I was induced to try this, which has afforded a most beautiful fence, so much so as to attract the attention of every person who has seen it. It divides my garden, is about three hundred feet in length, the plants set nearly a foot apart, is five feet high, and two feet wide at top, which is cut nearly level. It shoots early in the spring, makes a handsome appearance, and continues its verdure till very late in the fall. It has not so much spine as either the English or American hawthorn, but I think sufficient to protect it from cattle. The plant bears the knife or shears remarkably, and makes as close and tight a fence as either of the others, and is not subject to blight, as both of them have been with me. You will observe that Miller speaks of it as not so proper for hedges as the hawthorn or crab, which may be the case in England, but I cannot agree with him as it respects America.

"The tree furnishes a large quantity of seed, which rapidly vegetates; and I make no doubt it can be propagated by cuttings, which mode I shall adopt in the spring."

Propagation and culture.—"The purging buckthorn shrub is so common in the hedges of many parts of England, that t is seldom cultivated in gardens. It rises easily from seeds, if they are sown in autumn soon after the berries are ripe; but if they be left out of the ground till spring, the plants will not come up till the year after. These will require no particular treatment, but may be managed in the same way as young crabs, or any other hardy, deciduous tree or shrub. It may also be propagated by cuttings or layers. If the young shoots be layed in autumn, they will put out roots by the following autumn, when they may be taken off, and either planted in a nursery, to get strength for a year or two, or where they are desired to remain."—*Miller.*

Uses.—There are other uses to which this shrub may be applied besides that of forming hedges. Goats, sheep, and horses eat the leaves, but cows refuse them. The wood is said to be valuable for the turner. "From the juice of the unripe berries, with alum, a yellow, and from the ripe ones a fine green is obtained; the bark also strikes a yellow and brown red colour. The juice of the unripe berries is of the colour of saffron, and is used in staining maps or paper; that of the ripe berries is the sap green of miniature painters, and is much esteemed; but if they are gathered late in autumn, the juice is purple."—*Dom. Ency.*

A syrup prepared from buckthorn berries has been used in medicine, but is not often prescribed, as it occasions much sickness and griping. In a Latin treatise, published by Dr. J. G. Kolb, of Erlang, in Germany, the bark of the buckthorn is much recommended as a mild, cheap, and efficacious remedy, in every respect preferable to the berries.

Budding.—*See* INOCULATION, in the alphabetical order.

CABBAGE TRIBE. The cabbage tribe is of all the classes of cultivated culinary vegetables the most ancient, as well as the most extensive. The *brassica oleracea*, being extremely liable to sport or run into varieties and monstrosities, has, in the course of time, become the parent of a numerous race of culinary productions, so very various in their habit and appearance, that to many it may appear not a little extravagant to refer them to the same origin. Besides the different sorts of white and red cabbage and Savoys, which form the leaves into a head, there are various sorts of *borecoles*, which grow with their leaves loose in the natural way, and there are several kinds of cauliflower and broccoli, which form their stalks or flower-buds into a head.

All of these, with the turnip-rooted cabbage and the Brussels sprouts, claim a common origin from the single species of *brassica* above mentioned. Cabbage of some sort, White, in his History of Selborne, informs us, must have been known to the Saxons; for they named the month of February *Sprout kale.* Being a favourite with the Romans, it is probable that the Italian cabbage would be introduced at an early period into South Britain. To the inhabitants of the north of Scotland, cabbages were first made known by the soldiers of the enterprising Cromwell, when quartered at Inverness.—*Edin. Ency.* art. HORTICULTURE.

CABBAGE.—*Brassica oleracea capitata.*—Among the varieties of the cabbage, which have been introduced into this country, the following are enumerated in Mr. Russell's Catalogue:

Early Salisbury dwarf,
Early York,
Early Dutch,
Early sugarloaf,
Early London Battersea,
Large Bergen, or great American,
Early emperor,
Early Wellington,
Russian,
Large late drumhead,
Late imperial,
Late sugarloaf,
Large green glazed,
Tree, or thousand-headed,
Large Scotch, *for cattle,*
Green globe Savoy,
Red Dutch, *for pickling,*
Large cape Savoy,
Yellow Savoy,
Turnip-rooted, or Arabian, (above ground)
Turnip-rooted, (below ground)
Chou de Milan.

Soil and situation.—Every variety of cabbage grows best in a strong, rich, substantial soil, inclining rather to clay than sand; but will grow in any soil, if it be well worked, and abundantly manured with well rotted dung. But, according to Loudon, "The soil for seedlings should be light, and, excepting for early sowings, not rich. Where market gardeners raise great quantities of seedling cabbages to stand the winter, and to be sold for transplanting in the spring, they choose, in general, the poorest and stiffest land they have got, more especially in Scotland, where large autumnal sowings, of winter drumhead and round Scotch, are annually made, and where the stiffness of the soil gives a peculiar firmness of texture and hardiness of constitution to the plants, and prevents their being thrown out of the soil during the thaws which succeed a frosty winter. Transplanted cabbages require a rich mould, rather clayey than sandy; and, as Neill and Nicol observe, it can scarcely be too much manured, as they are an exhausting crop. Autumnal plantations, intended to stand the winter, should have a dry soil, well dug and manured, and of a favourable aspect. The cabbage, whether in the seed-bed or final plantation, ever requires an open situation. Under the drip of trees, or in the shade, seedlings are drawn up weak, and grown crops are meager, worm-eaten and ill-favoured.

Sowing cabbage seed.—M Mahon says, "The proper period for sowing cabbage in the Middle States, to produce *early* summer cabbages, is between the sixth and the tenth of September, if intended to be transplanted into frames in October, for winter protection, which is the preferable method; but if they are designed for remaining in the seed-beds till spring, the period is between the fifteenth and twentieth. However, it will be very proper to make two or three sowings within that time, as it is impossible to say whether the fall may be favourable or otherwise, and, therefore, the better way is to be prepared in either case by successive crops.

"The consequence of having crops too early is, that they are subject to run to seed in the spring soon after being planted out; and if the seeds are sown too late, the plants do not acquire sufficient strength before winter to withstand its rigour, without extraordinary care. But in either case there is a remedy; that is, if the plants are likely to become too luxuriant and strong, transplant them once or twice in October, and if too backward and weakly, make a slight hot-bed towards the latter end of that month, and prick them out of the seed-bed thereon; this will forward them considerably."

Mr. M'Mahon thinks that, in the Eastern States, the fore part of September will be a suitable time to sow cabbages intended to be grown the succeeding summer. The seeds should be covered about a quarter of an inch deep, and, if the weather prove dry, should be watered occasionally in the evening till they come up. According to Abercrombie's seed estimate, "for a seed-bed to raise the early York and similar varieties, four feet wide by twenty in length," two ounees will be required; for a seed-bed to raise the large sugarloaf, and other luxuriant growers, four feet by thirty-six in length, two ounces. The same writer directs to "sow at three different seasons, that is, spring, summer and autumn, and cover from an eighth to a quarter of an inch. Under a deficiency of winter standing young plants for final transplanting in spring, or in order to have some spring sown plants as forward as possible, a moderate portion of some best early sorts may be sown between the middle of February and the middle of March, in a slight hot-bed or frame, to nurture the plants till the leaves are an inch or two in length. Then prick them into intermediate beds in the open garden, there to gain strength for final transplanting."

Planting in New England.—"Some drop the seeds where the cabbages are to grow. By this they escape being stinted by transplanting; for winter cabbages, the latter part of May is early enough to put the seed into the ground, whether the plants are to be removed or not. I have tried both ways, and, on the whole, I prefer transplanting. They are otherwise apt to be too tall, and to have crooked stems. Covering plants with leaves is not a good practice. They will be much heated through some sorts of leaves, the free circulation of air about them will be prevented, and their perspiration partly obstructed. If a hot sun cause them to droop, a shingle, stuck into the ground, will be sufficient shelter, if it be on the south side of the plants. I commonly allow each plant two shingles, one on the south-east side, and one on the south-west, meeting at the south corner."—*Deane.*

The act of planting should be performed carefully. Holes, of sufficient depth and width, should be dibbled, for the smaller sorts of cabbages, at the distance of two feet and a half, and, for the larger sort, of three feet every way. In these the earth should be placed up to the lower leaves, and the earth brought closely about the roots, which is best done by pushing down the dibbler, at a small angle with the plant, and then bringing it up to it with a jerk. This leaves no chambering, (as gardeners call it,) no vacancy between the plant and the soil.

"The state of the weather, when these operations are performed, is not a matter of indifference, and has been a subject of controversy; some recommending dry weather, others wet. As in many other cases of disputation, the truth lies between them—that is, moist weather is neither dry nor wet, and is precisely that which is best for setting out cabbages, or any other vegetable. We ought not, however, to wait long for even this most favourable state of the atmosphere, since, with a little labour, we have the means of making up for its absence."—*Armstrong.*

"Dig the plants up, that is, loosen the ground under them with a spade, to prevent their being stripped too much of their roots. The setting stick should be the upper part of a spade or shovel handle. The eye of the spade is the handle of the stick. From the bottom of the eye, to the point of the stick, should be about nine inches in length. The stick should not be *tapering*, but nearly of equal thickness all the way down to within an inch and a half of the point, where it must be tapered off to the point. If the wood be cut away, all round, to the thickness of a dollar, and *iron* put round in its stead, it makes a very complete tool. The iron becomes bright, and the earth does not adhere to it as it does to wood. Having the plant in one hand, and the stick in the other, make a hole suitable to the root that it is to receive. Put in the root in such a way, that the earth, when pressed in, will be on a level with the but-ends of the lower or outward leaves of the plant. Let the plant be rather higher than lower than this; for care must be taken not to put the plant so low as for the earth to fall, or be washed into the heart of the plant, nor even into the inside of the bottom leaves. The stem of a cabbage, and the stems of all the cabbage kind, send out roots from all the parts of them that are put beneath the surface of the ground. It is good, therefore, to plant as deep as you can without injury to the leaves. The next consideration is, the *fastening of the plant in the ground.* The hole is made deeper than the length of the root, but the root should not be bent, at the point, if it can be avoided. Then, while one hand holds the plant, with its root in the hole, the other hand applies the setting stick to the earth on one side of the hole, the stick being held in such a way as to form a sharp triangle with the plant. Then, pushing the stick down, so that its point go a *little deeper than the point of the root*, and giving it a little *twist*, it presses the earth against the point, or bottom of the root. And thus all is safe, and the plant is sure to grow."—*Cobbett.*

After-culture.—Little more is necessary than to stir the ground pretty frequently, and keep it clear of weeds. It is recommended to hoe the ground while the dew is on, once a week, till they begin to head.

Diseases and insects.—Cabbages are liable to a disease in the roots, in which they become swelled and knobby, and the plants of weak and imperfect growth. This disorder is called *stump foot*, *fumble foot*, &c. It has been supposed to be caused by the attacks of grubs, below the surface of the ground; and the disorder is said to be chiefly prevalent where the same sorts of cabbages have been raised on the same ground several years in succession. Lovet Peters, Esq. of Westborough, Mass., says, the cause of the stump foot, is in the soil:—"Few pieces of land, I believe, that have been, for several successive years under the plough, will produce a good crop of cabbages, though there may be exceptions. My method of raising them, which I have practised several years with complete success, is the following:—In the spring, take a piece of green sward, of a good soil, and free from stones, and turn it over with the plough as flat as possible; then spread on a large quantity of good manure: if it has been previously mixed with leached ashes, the better. Then harrow greatly, and early in June: if for winter cabbage, cut holes through the turf, with a hoe, as near together as the cabbages ought to grow; fill the holes with fine earth and manure, and then set the plants, or put in a small number of seeds: I prefer the latter, however,* since it saves the labour of setting, and is much surer of success, if it happens to be a time of drought. They will need no more hoeing than is necessary to keep down the weeds. In this way, I have raised cabbages of the largest size, in a green sward potato field, without more hoeing than was necessary for the potatoes."

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* Cultivators do not agree on the subject of transplanting cabbage plants, or sowing the seeds in the spots where the plants are to grow. Dr. Deane, as has appeared above, after having tried both methods, gave the preference to transplanting. Mr. Peters, we have seen, prefers the other mode. Mr. Bordley relates an experiment, in which he "compared cabbages transplanted with others *not once moved*. The *unmoved* grew, and were better than the *moved*." Mr. Cobbett says, "to have *fine* cabbages of any sort, they must be *twice* transplanted. First, they should be taken from the seed-bed, (where they have been sown in beds near to each other,) and put into fresh dug, well-broken ground, at six inches apart, every way. This is called *pricking out*. By standing here about fifteen or twenty days, they get straight, and stand strong, erect, and have a straight and stout stem. Out of this plantation they come *all of a size*; the roots of all are in the same state, and they strike quicker into the ground where they stand for a crop." According to *Rees' Cyclopedia*, it was the practice of the celebrated Bakewell, and other cultivators who followed his example, to drill cabbage seed where the plants were to remain. Perhaps there would be no necessity for transplanting cabbages, in order to make the stems "straight and stout," according to Mr. Cobbett's directions, if the plants were not originally sown too thick, or were properly thinned at an early period of their growth. An English writer says, "Much injury frequently arises to young cabbage plants, from the seed being

Cabbage plants are liable to be attacked, by a grub or black worm, in the night, which eats off the stalks, just above ground, and buries itself in the ground as soon as the sun rises. Dr. Deane observed, that a little circle of lime or rock-weed round the plant, will preserve it, and recommends digging for the worm near the place which shows the marks of its ravages, and destroying it. Scalding the hills with boiling water, and then enclosing them with boards, barks, or shingles, would be an effectual, but troublesome mode, of guarding against worms. The *Economical Journal of France* gives the following method, which, it states, is infallible, to guard not only against caterpillars, but all other insects which infest cabbages or other vegetables:—Sow with hemp all the borders of the ground where the cabbage is planted; and, although the neighbourhood be infested with caterpillars, the place enclosed with hemp will be perfectly free, and not one of the vermin will approach it. Watering the plants with water which had been poured boiling hot on elder leaves, or walnut leaves, and suffered to stand till cool, has been recommended. The following mixture is also said to be a preservative against all kinds of insects:—Take a pound and three quarters of soap, the same quantity of flowers of sulphur, two pounds of puff balls, and fifteen gallons of water. When the whole has been well mixed, by the aid of a gentle heat, sprinkle the insects with the liquor, and it will instantly kill them. To get rid of the *aphides* or cabbage lice, watering the plants with soap-suds, or a solution of salt in water, (not too strong, lest it kill the plants,) is said to be efficient.

Use.—The culinary uses of the cabbage are too well known to need description or recapitulation. If they grow near a yard where cattle are kept, the under leaves, when they begin to decay, may be stripped off and given them.

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sown too thick; care should, therefore, be taken, to have them properly thinned out, whenever they come up in too thick a manner. Probably, if the plants were sown in the hills in which they are intended to grow for a crop, and thinned out in due season, they would grow as straight and stout, as if they had been several times transplanted."

The plants will not be injured, and they are an excellent food for cattle, and will much increase the milk of cows. But the least decayed alone should be given to cows, lest they give the milk a bad taste. Much account is made of cabbages, in England, for feeding cattle in the winter; but the difficulty of preserving them renders them less valuable for that purpose with us. Cabbages are also eaten by swine and horses, and are thought to be excellent food for ewes that have newly dropped their lambs, and for calves.

Preserving cabbages.—Mr. M'Mahon recommends the following method for preserving cabbages for winter and spring use:—"Immediately previous to the setting in of hard frost, take up your cabbages and Savoys, observing to do it in a dry day; turn their tops downward, and let them remain so for a few hours, to drain off any water that may be lodged between their leaves; then make choice of a ridge of dry earth, in a well-sheltered, warm exposure, and plant them down to their heads therein, close to one another, having previously taken off some of their loose, hanging leaves. Immediately erect over them a low, temporary shed, of any kind that will keep them perfectly free from wet, which is to be open at both ends, to admit a current of air in mild, dry weather. These ends are to be closed with straw when the weather is very severe. In this situation, your cabbages will keep in a high state of preservation till spring; for, being kept perfectly free from wet, as well as from the action of the sun, the frost will have little or no effect upon them. In such a place the heads may be cut off as wanted, and if frozen, soak them in spring, well, or pump water, for a few hours previous to their being cooked, which will dissolve the frost, and extract any disagreeable taste occasioned thereby."

The principal gardener in the Shaker establishment, in New Lebanon, Columbia county, N. Y. directs not to pull up cabbages in autumn, "till there is danger of their freezing too fast in the ground to be got up. If there happens an early snow, it will not injure them. When they are removed from the garden, they should be set out again in a trench dug in the bottom of a cellar. If the cellar is pretty cool, it will be the better."

The *London Monthly Magazine* gives the following method, by which cabbages may be preserved on board ships,

&c.—"The cabbage is cut so as to leave about two inches or more of the stem attached to it; after which the pith is scooped out to about the depth of an inch, care being taken not to wound or bruise the rind by this operation. The cabbages then are suspended by means of a cord, tied round that portion of the stem next the cabbage, and fastened at regular intervals to a rope across the deck. That portion of the stem from which the pith is taken, being uppermost, is regularly filled with water."

To save cabbage seed.—"The raising of the seed of the different sorts of cabbage, Neill observes, affords employment to many persons in various parts of England. It is well known that no plants are more liable to be spoiled by cross breeds, than the cabbage tribe, unless the plants of any particular variety, when in flower, be kept at a very considerable distance from any other; also in flower, bees are extremely apt to carry the pollen of the one to the other, and produce confusion in the progeny. Market gardeners, and many private individuals, raise seed for their own use. Some of the handsomest cabbages of the different sorts are dug up in autumn, and sunk in the ground to the head; early next summer a flower-stem appears, which is followed by abundance of seed. A few of the soundest and healthiest cabbage-stalks, furnished with sprouts, answer the same end. When the seed has been well ripened and dried, it will keep for six or eight years. It is mentioned by Bastien, that the seed-growers of Aubervilliers have learned by experience, that seed gathered from the middle flower-stem produces plants, which will be fit for use a fortnight earlier than those from the seed of the lateral flower stem; this may deserve the attention of the watchful gardener, and assist him in regulating his successive crops of the same kind of cabbage."—*Loudon.*

Field culture.—The variety cultivated in the fields for cattle is almost exclusively the large Scotch, or field cabbage. The land is prepared the same way as for other hoed crops. "The preparation given to the plants," says Loudon, "consists in pinching off the extremity of their tap-root, and any tubercles which appear on the root or stem, and in immersing the root and stem in a puddle or mixture of earth and water, to protect the fibres and pores of the roots and stem from drought. The plants may then be inserted by the dibber, taking care not to plant too deep, and to press the earth firmly to the lower extremity of the root. If this last point is not attended to, the plants will either die, or, if kept alive by the moisture of the soil, or rain, their progress will be very slow. When the distance between the ridglets [or rows] is twenty-seven inches, the plants are set about two feet asunder in the rows, and the quantity required for an acre is about 6000 plants." The after-culture, preservation, uses, &c., have been sufficiently detailed in the preceding pages, under this head.

CANKER-WORM.—*See* INSECTS.

CARAWAY.—*Carum carui.*—"The caraway is a biennial plant, a native of England, being occasionally found in meadows and pastures. It rises a foot and a half high, with spreading branches; the leaves are decompound; the leaflets in sixes; it produces umbels of white flowers in June.

"*Use.*—The plant is cultivated chiefly for the seed, which is used in confectionary and in medicine. In spring, the under leaves are sometimes put in soups; and in former times the fusiform roots were eaten as parsnips, to which Parkinson gives them the preference. In Essex, large quantities of the seed are annually raised for distillation with spirituous liquors.

"*Culture.*—It is raised from seed, of which a quarter of an ounce is sufficient for a seed-bed four feet by five. Sow annually, in autumn, soon after the seed is ripe: the seedlings will rise quickly, and should be thinned to a foot's distance each way. In default of sowing in autumn, sow in March or April, either in drills or broad-cast; but the plants, so raised, will not in general flower till the following year. When the seed is ripe, the plant is generally pulled up in gathering, especially in field culture."—*Loudon.*

CARDOON.—*Cynara cardunculus.*—The cardoon is a hardy, perennial plant, a native of Candia, introduced into England in 1658. It is a species of artichoke, and grows wild in the south of France.

Propagation.—"Though a perennial, it often dies in the winter, and therefore requires to be raised from seed almost every year; and, for a bed four feet wide by eight feet, two ounces are sufficient. Formerly the plants were raised on hotbeds, and transplanted in May and June, but now the seed is generally sown where the plants are to remain."—*Loudon*

Use.—"The parts of the cardoon that are eaten are not those belonging immediately to the flower, as of the artichoke, but the roots, stalks, and middle ribs of the leaves and chiefly the latter, which are thick and crisp. But as all these are naturally bitter, the plants are blanched by being tied up like lettuces, about the month of September, and having earth thrown upon their lower parts to the depth of eighteen inches or two feet. Cardoons come into season about the end of November; and are either eaten alone, or as a sauce to animal food, particularly roast meat; or are introduced as a dish in the second course."—*Loudon.*

CARROT.—*Daucus.*—This plant is said to be a native of Great Britain, where it is still found growing wild. There are many varieties of the carrot; and the following are the finest sorts enumerated in Mr. Russell's Catalogue:

Altringham, (a superior sort,)
Early horn,
Cremer, (fine for the table,)
Lemon,
Long orange,
Blood red.

Soil.—"The carrot requires a light, mellow soil, mixed with sand, and should be dug or trenched one or two spades deep, breaking well all the lumpy parts, so as to form a porous bed, and an even surface. The orange and red sorts, on account of their longer roots, require a soil proportionably deeper than the horn."

Seed estimate and sowing.—The seeds have numerous forked hairs on their borders, by which they adhere together, and therefore should, previously to sowing, be rubbed between the hands, and mixed with dry sand, in order to separate them as much as possible. They are also very light, and therefore a calm day must be chosen for sowing; and the seeds should be disseminated equally, and trodden in before raking. Previously to sowing, if convenient, the seed should be proven, by sowing a few in a pot, and placing it in a hot-bed or hot-house, as it is more frequently bad than most seeds. For a bed 4½ feet by 30, one ounce will be requisite, and the same for 150 feet of drill row. Dr. Deane advises to sow carrots in drills from 9 to 12 inches apart, across beds 4 feet wide. M'Mahon directs to sow thin in drills, distant from each other from 8 to 10 inches, and to thin them to 3 inches, plant from plant, in the rows.

To save seed.—Plant some largest, best roots early in the spring, two feet apart; insert them a few inches over the crowns. They will yield ripe seed in autumn, of which gather only from the principal umbel, which is likely not only to afford the ripest and largest seed, but the most vigorous plants.

Field culture.—"The only sort of carrot adapted to field culture," says Loudon, "is the long red, or field carrot. New seed is most essential, as it will not vegetate the second year. The best soil for the carrot is a deep, rich, sandy loam; such a soil ought to be at least a foot deep, and all equally good from top to bottom. On any other the field culture of the carrot will not answer.

"The usual preparation of the seed for sowing is the mixing it with earth or sand, to cause it to separate more freely; but Burrows adds water, turns over the mixture of seeds and moist earth several times, and thus brings it to the point of vegetating before he sows it. Having weighed the quantity of seed to be sown, and collected sand or fine mould, in the proportion of about two bushels to an acre, I mix the seed with the sand or mould, eight or ten pounds to every two bushels, and this is done about a fortnight or three weeks before the time I intend sowing; taking care to have the heaps turned over every day, sprinkling the outside of them with water each time of turning over, that every part of the sand heaps may be equally moist, and that vegetation may take place alike throughout. I have great advantage in preparing the seed so long before hand; it is by this means in a state of forward vegetation, therefore lies but a short time in the ground, and, by quickly appearing above ground, is more able to contend with those numerous tribes of weeds in the soil, whose seeds are of quicker vegetation."

The quantity of seed, when carrots are sown in rows, is two pounds per acre; and, for broad-cast sowing, five pounds. The rows for the larger or proper field carrots, should be from 14 to 16 or 18 inches apart; and the carrots thinned, in hoeing, to 3 or 4 inches apart in the rows. The seeds will do best when sown by hand, as their shape does not well admit of their being sown by machines. Loudon says, "It has been advised, by an intelligent cultivator, to deposit the seed to the depth of one inch in the rows, leaving the spaces of fourteen inches between them as intervals; the seed, in these cases, being previously steeped in rain water for twenty-four hours, and left to sprout, after which it is mixed with saw-dust and dry mould, in the proportion of one peck and a half of each to a pound of seed. The land is afterwards lightly harrowed over once in a place. Two pounds of seed, in this mode, is found, as has been observed, sufficient for an acre of land."

After-culture.—The first hoeing of carrots must be by hand—an operation which requires a great deal of attention, as it is difficult to distinguish and separate the weeds from the young carrots. Loudon says, "From eight to fifteen or eighteen inches, each way, is the common distance at which they are allowed to stand; and it has been proved, from many years' experience in districts where they are most cultivated, that carrots which grow at such distances always prove a more abundant crop than when the plants are allowed to stand closer together." Deane observed, "It is not amiss if they grow large and rank, when they are chiefly designed as food for cattle, though small-sized ones are preferred for the table."

Mr. Quincy gives the following statement of the mode of cultivating carrots, made use of by Samuel Wyllys Pomeroy, Esq., and which he prefers to all others:—

"Plough as deep in the fall or spring as the state of the land will permit. Cross-plough in the spring, and harrow level. Put on fifteen, twenty, or twenty-five buck-loads of the most rotten compost to the acre, as the heart of the land may be. Spread and harrow it fine. Then, with a horse-plough, strike it into two-bout ridges, as near together as four back furrows will make them, and if the two first back furrows are narrow, the other two being deep, the ridge will be nearly to a point, and should be eighteen or twenty inches from the bottom of the furrow, if it be well cleared out. To do which, make another bout in the furrow, if necessary. Then, with the head of a rake, strike off the crown of the ridge, till it is three or four inches wide, and with it, or a hoe, open a drill in the usual manner. Sow the seed pretty thick, cover and press down a little with a hoe or shovel. When the weeds appear, run a small plough through the furrows. Hand-weed the crop, and hoe the weeds from the sides of the ridge. The orange carrot is best."

"In harvesting, a plough with one yoke of oxen should be run near the side of the range of carrots, and as deep as possible. This loosens the dirt, and clears one side of the carrots almost entirely from the earth. The labourers then, with great facility, take them by their tops out of the beds, and throw them into carts, with only an occasional use of the hoe to plants which the plough has not loosened.

"I have no question that, conducted in this mode, a carrot crop may be made more productive, and much less expensive, than the potato crop usually is. In sowing, I use a small hand-drill, which lays the seed with great regularity—a circumstance very important both to facilitate weeding and harvesting; since, if the carrots stand straggling, and not in a line, the plough, when harvesting, leaves the more to be loosened by the hoe or the fork."—*Massachusetts Agricultural Repository*, vol. iv. p. 24.

A mode of cultivating carrots, differing slightly from the above, is described by Mr. Quincy, in the same work, vol. iv. p. 212.

For other modes of cultivating this root, see *Mass. Agr Rep.* vol. v. pp. 20, 255, 347.

Use.—"Horses are remarkably fond of carrots, and it is even said, that, when oats and carrots are given together, the horses leave the oats, and eat the carrots. The ordinary allowance is about forty or fifty pounds a day to each horse. Carrots, when mixed with chaff, that is, cut straw, and a little hay, without corn, keep horses in excellent condition for performing all kinds of ordinary labour.

"In comparing the carrot with the potato, an additional circumstance greatly in favour of the former is, that it does not require to be steamed or boiled, and it is not more difficult to wash than the potato. These and other circumstances considered, it appears to be the most valuable of all roots for working horses.

"The use of the carrot in domestic economy is well known. Their produce of nutritive matter, as ascertained by Sir H. Davy, is ninety-eight parts in one thousand; of which three are starch, and ninety-five sugar. They are used in the dairy in winter and spring to give colour and flavour to butter. In the distillery, owing to the great proportion of sugar in their composition, they yield more spirit than the potato; the usual quantity is twelve gallons per ton. They are excellent in soups, stews, and haricots, and boiled whole with salt beef.

"The diseases of carrots are only such as are common to most plants, such as mildew, insects, &c. The mildew and worms at the root frequently injure crops, and are to be guarded against, as far as practicable, by a proper choice, soil, season of sowing, and after-culture."—*Loudon.*

CATERPILLAR—an insect on fruit trees.—*See* INSECTS.

CAULIFLOWER.—*Brassica oleracea var. botrytis.*—The cauliflower is one of the most delicate and curious of the whole of the *brassica* tribe; the flower buds forming a close, firm cluster or head, white and delicate, for the sake of which the plant is cultivated.

Varieties.—Early, (*for the first, early crops.*)—Later, or large, (*for principal crops.*)

"*Propagation and soil.*—The cauliflower is raised from seed, of which half an ounce is sufficient for a seed-bed four feet and a half wide, by ten in length. The soil for the seed-bed may be light, but, for final transplanting, it can hardly be too rich, the cauliflower, like the vine, being reputed a 'rough feeder.' Cleanings of streets, sesspools, &c., ought, therefore, to be liberally supplied during the growth of the plants, when very large heads are desired.

"*Times of sowing.*—The early and main superior crop, brought to fruit by the longest nursery attendance; the late summer succession crop, raised by the shortest course; and the Michaelmas (29th of Sept.) crop, obtained at the least expense, are sown, respectively, at three different seasons. The principal sowing is made about the end of the third week in August, or a day or two before or after the 21st, to raise plants to stand over winter, under frames, hand-glasses, or half-sheltered warm borders, for the early and main superior crops next summer. A secondary sowing in February or March, for succession, and late inferior crops the same year in summer and autumn. A final sowing, near the close of May, for ordinary crops, to yield fruit the following autumn and winter. The seedlings, protected with glass frames, generally grow too gross in the stems, which become partly blackened, and the plants, being thus unhealthy, are not fit for planting out. Late-raised seedlings, which spend the winter in the open border, uniformly become the large and finest table cauliflowers during the summer, though they certainly do not come in quite so early. Cauliflower plants, it is probable, are often killed with too much attention. Seedlings, raised late in autumn, seem to be very tenacious of life."—*Caled. Hort. Mem.* iii. 192. "A method of producing cauliflowers, pretty early, and with great certainty, is this:—The plants are set in small pots in the winter season, and kept in any convenient part of the floor of a vinery or other glazed house. In the beginning of March, they are taken out of the pots with the ball of earth attached, and planted in the open ground. If they be here protected against severe frosts with bell-glass covers, they come into head in the course of April, if the weather prove favourable."—*Neill, in Edin. Encyc.*

Drummond, of the Cork botanic garden, protects cauliflower plants during winter by planting them in excavations made in the common soil of the garden, and covered with frames thatched with long, straight wheat straw. He uncovers constantly, in mild weather, whether nights or days.—*Hort. Trans.* v. 369.

For after-culture, preservation through winter, saving seed, &c. proceed as with the common white cabbage.

Use.—"Among the succulent plants produced in our climate, this doubtless is one of the most nourishing, and likewise the best adapted to tender organs of digestion, especially in valetudinarians and invalids: such persons, however, ought to eat it with the addition of some aromatic spice, such as pounded cardamoma, or caraway, or a small proportion of bread. To make the cauliflower blanch handsomely, the gardeners tie over the heads of the plant.

"*To prepare cauliflowers.*—Let the cauliflowers first be parboiled; next they must be immersed in cold, hard water, for some time, till they be nearly wanted for the table; thus, on being boiled for a few minutes, they will become more firm and crisp than if cooked in the usual manner."—*Dom. Encyc.*

Neill (in *Edinburgh Encyc.*) observes, "These heads or flowers being boiled, generally wrapped in a clean linen cloth, are served up as a most delicate vegetable dish. Cauliflower is a particular favourite in this country. 'Of all the flowers in the garden,' Dr. Johnson used to say, 'I like the cauliflower.' For the early supply of the London market, very great quantities of cauliflower are fostered under hand-glasses during winter and the first part of spring; and to behold some acres overspread with such glasses, gives the stranger a forcible idea of the riches and luxury of the metropolis."

CELERY.—*Apium graveolens.*—Celery is a hardy biennial plant, a native of Great Britain, and, when in its wild state, it is denominated *smallage.* The root, in its wild state, is thick and fibrous. The stalk is bushy and furrowed, and attains the height of two or three feet. The leaves are wedge-shaped, and the flowers yellow, which are produced in August. The varieties usually cultivated are, the

White solid,
Rose-coloured solid,
Italian, and
Celeriac, or turnip-rooted.

Propagation.—All the sorts are raised from seed; and half an ounce is reckoned sufficient for a seed-bed four feet and a half wide by ten feet in length, of the upright sorts; but for celeriac, a quarter of an ounce will be enough for a bed four feet square.

Soil.—Celery delights in a soil rather moist, rich in vegetable mould, but not rank from new, unrotted dung.

Times of sowing.—"The most forward crop is slightly forced; any of the varieties may be sown in the spring, in he open garden, at two or three different times, from the 21st of March till the first week in May; but the principal sowing should be made in the first fortnight in April. Sow in beds of light mellow earth, and rake in the seed lightly and regularly. In very dry weather, give moderate watering both before and after the plants come up. When they are two, three, or four inches high, thin the seed-bed, and prick out a quantity, at successive times, into intermediate beds, three or four inches asunder. Water those removed until they have struck" [*taken root.*]—*Loudon.*

Transplanting into trenches.—"When either the plants left in the seed-bed, or those removed, are from six to twelve inches high, or when the latter have acquired a stocky growth, by four or five weeks' nurture in the intermediate bed, transplant them into trenches for blanching. For this purpose, allot an open compartment. Mark out the trenches a foot wide, and from three to three and a half distance; dig out each trench lengthwise, ten or twelve inches in width, and a light spit deep, that is, six or eight inches. Lay the earth dug out equally on each side of the trench; put about three inches of very rotten dung into the trench, then pare the sides, and dig the dung and parings with an inch or two o' the loose mould at the bottom.

Trim the tops and roots of the plants, and then set them in single rows along the middle of each trench, allowing four or five inches distance from plant to plant. When this work is finished, give the plants water in plenty, and occasionally water them from time to time, if the weather be dry, and likewise let them be shaded, till they strike root, and begin to grow. When they have grown to the height of eight or ten inches, draw earth to each side of them, breaking it fine. This should be done in dry weather, being careful not to bury the hearts. Repeat the earthing once in ten days, till the plants are fit for use. Be careful, however, not to draw up too much earth to the plants at first, lest they be smothered, and leave the plants in a little hollow, that they may receive the full benefit of the waterings, rain, &c."

Taking the crop.—It is best to begin at one end of a row, and dig clean down to the roots, which then loosen with a spade, and they may be drawn up entire, without breaking the stalks.

To preserve this plant during the winter, on the approach of frost, take up a part of the crop, and lay it under sand for winter use. Those left in the beds may be covered with litter, to be removed in mild weather. Cobbett directs, to preserve celery in beds, as follows:—"Two boards, a foot wide each, their edges on one side laid upon the earth of the ridge, formed into a *roof* over the point of the ridge, the upper edge of one board going an inch over the upper edge of the other, and the boards fastened well with pegs, will do the business completely; for it is not the frost, but the occasional *thaws*, that you have to fear, and the *wet* and *rot* that they produce."

To save seed.—Either leave some established plants in the spring where growing, or in March, as soon as the frost will permit, set the plants in the ground, full two feet asunder.

Cultivation of celeriac.—The times of sowing are the same as for the other sorts. In the beginning or middle of June, they are transplanted into a flat bed in the open air, at the distance of fifteen inches from each other, and not in trenches, like other celery. They must be abundantly watered as soon as they are set out, and the watering must be repeated every other day, or, if the weather should be warm, every day. As they increase in size, they will require a greater quantity of water, and they must be occasionally hoed. The roots will be fit for use in September or October. Sabine states, that he has been informed that the plan of giving excess of water is peculiar to this plant, and that its vigorous growth is more dependent on richness of soil than any other cause. Abercombie directs to earth up the bulbs four or five inches, after they are full grown, in order to blanch them.

" *Use.*—The blanched leafed-stalks are used raw, as a salad, from August till March; they are also stewed, and put in soups. In Italy, the unblanched leaves are used for soups, and when neither the blanched nor the green leaves can be had, the seeds bruised form a good substitute. The root only of the variety called the celeriac is used, and Sabine informs us (*Hort. Trans.* vol. iii.) 'it is excellent in soups, in which, whether white or brown, slices of it are used as ingredients, and readily impart their flavour. With the Germans, it is also a common salad, for which the roots are prepared by boiling, until a fork will pass easily through them: after they are boiled, and become cold, they are eaten with oil and vinegar. They are also sometimes served up at table, stewed with rich sauces. In all cases, before they are boiled, the coat and the fibres of the roots, which are very strong, are cut away; and the root is put in cold water, on the fire, not in water previously boiling.' "—*Loudon.*

CHAMOMILE.—*Anthemis nobilis.*

Varieties.—These are the common single and double-flowered.

Soil and culture.—This herb delights in a poor, sandy soil. " Both kinds are propagated by parting the roots, or by slips of the rooted offsets or of the runners. Detach them with roots in little tufty sets in March, April or May, and plant them from eight to twelve inches asunder, giving water. The flowers should be gathered in their prime, in June or July, just when full-blown. Let them be spread to dry in a shady place; then put them into paper bags, and house them for use."—*Abercrombie.*

" *Use.*—It is cultivated on account of the flower, which is a safe bitter and stomachic, and much used under the name of chamomile-tea. The double-flowering variety, though more beautiful than the single-flowered, is less useful; the aromatic principle not residing in the floscules of the ray, the multiplication of which constitutes the double flower. The double sort, however, is most cultivated by growers

for the market, on account of its greater bulk and weight."
—*Loudon.*

CHERRY-TREE.—*Prunus cerasus.*—The cherry is a genus of plants, which comprises too many species to be described in this place. Loudon's catalogue contains thirty-six kinds, but does not include all that are cultivated in England; and there are several varieties in the United States, which are natives of the country. See *Thacher's Orchardist*, *Coxe on Fruit-Trees*, and *Domestic Encyclopedia*. Gen. Dearborn's communication for *N. E. Farmer*, vol. v. p. 210.

"The cherry-tree is propagated by seeds and by suckers, when stems are wanted; by seeds alone, when new varieties are required;* by scions, when you have to work on old subjects; and by buds, when your trees are young. If intended for dwarfs, bud your plants at *two*, and if for standards, at *four* years of age. The spring succeeding this operation is the time for transplanting; which should be done carefully, and in the manner prescribed for setting out apple-trees. The fashion or form of the trees will direct the distance at which they are to stand from each other; between standards this should not be less than thirty feet;† and between pyramids and espaliers, not less than twenty.

"Though in our climate all the varieties of the cherry-tree do well as standards and pyramids, and are therefore generally and properly cultivated in these forms, still it may be useful to remark, that two of them, the May duke and the Morello, when trained against walls, give fruit not only of increased precocity, but of much finer flavour; a circumstance in which they differ, not only from all other varieties of their own races, but from fruit-trees of all other kinds.

"As the cherry grows on small spurs, pushing from the sides and ends of two, three, and four years old wood, and as the procession of new buds is constant, it follows as a general rule, that 'the knife must be sparingly employed;' and as a particular one in relation to wall-trees, that 'bearing branches are not to be shortened, if room can be found for extending them.' These rules, however rigorously executed, must not prevent *summer* pruning, (which consists in rubbing off redundant or ill-placed buds,) nor that of *winter*, if confined to the renewal of fractured and unsound wood, or branches too much multiplied, or crossing each other. The nature of the Morello will, however, render it an exception to the general practice here recommended; for, instead of bearing like the other varieties, on two, three, and even four years old wood, its fruit is generally produced on shoots of the last year, and rarely, if ever, on even two years old wood. Whence it follows, that, with regard to this variety, our aim, in both summer and winter pruning, ought to be 'a removal of old, and a provision of new bearers.'

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* The seeds employed should be taken from ripe fruit, committed promptly to a bed of sand, and kept in a dry and cool place till the spring, when they may be set out in rows two and a half feet apart.

† Miller thinks the distance should be forty feet.

"In renovating an old tree, pursue Forsyth's method–shorten it to a stump not more than eighteen inches high; remove the old soil from the roots; replace it with that of upland pasture, on a layer of stone or other impervious body, two feet below the surface; and encourage a single shoot."—*Armstrong.*

Use.—"It is a refreshing summer fruit, highly grateful at the dessert, and affording pies, tarts, and other useful and elegant preparations in cookery and confectionary. Steeping cherries in brandy qualifies and improves its strength and flavour; a fine wine is made from the juice, and a spirit distilled from the fermented pulp. The gum which exudes from the tree is equal to gum arabic; and Haselquist relates, that more than two hundred men, during a siege, were kept alive for nearly two months, without any other sustenance than a little of the gum taken sometimes into the mouth, and suffered gradually to dissolve. Cherry wood is hard and tough, and is used by the turner, flute-maker and cabinet-maker."—*Loudon.*

"The common wild or native cherry, (*Prunus cerasus Virginia*,) though it bears only a small, bitter cherry, which serves as food for birds, is valuable on account of its medicinal bark, and also for its timber, which is of a reddish, streaked colour, resembling mahogany, and capable of receiving a fine polish; it is used by turners and cabinet-makers for many purposes. The tree grows to a large size.

"Cherry brandy is made in the following manner:—Fill the cask with an equal proportion of Morello and sweet black cherries; pour over them as much brandy as the cask will contain. When it has been on ten days, draw it off, and pour on hot water; let this remain some time, shaking the cask frequently, then draw it off, mixing the last with the first liquor."—*Domestic Encyclopedia.*

Dr. Cooper adds, in the last edition—"It is best made with the small wild black cherry." Cattle, it is said, have been killed by eating leaves of the wild cherry-tree. For a method of making cherry wine, see *N. E. Farmer*, ii. 27.

CHERVIL.—*Chærophyllum.*—This is an annual plant, with leaves resembling those of double parsley. It is used for salads and in soups, and is sown occasionally in rows, like parsley, from April to September.

CHIVE.—*Allium schœnoprasum.*—"The *chive*, or *cive*, is a hardy perennial plant, a native of Britain, and found in meadows and pastures, though but rarely. The leaves rise from many small bulbous roots connected in bunches; are awl-shaped, thread-like, and produced in tufts. The flowers are white, tinged with reddish-purple, and appear on round stalks in June."—*Loudon.* It is of common and easy cultivation.

COLEWORT.—*Brassica oleracea viridis.*—"The original variety of cabbage, called colewort," says Loudon, "is, or seems to be, lost, and is now succeeded by what are called cabbage-coleworts. These, Abercrombie observes, are valuable family plants, useful in three stages; as young open greens, as greens with closing hearts, and as greens forming a cabbage growth." The culture and uses of the cabbage-colewort are so similar to those of the common white cabbage, that details on the subject would seem unnecessary.

It is said in *Gleanings on Husbandry*, &c. that colewort is "a name given by gardeners to a cabbage plant, to be cut for use from the time the leaves are as broad as a man's hand, till it begins to form a close head. They are generally raised from seeds of any of the best kinds of heading white cabbage; but those of the sugar-loaf are preferable to all others for eating."

CORIANDER.—*Coriandrum sativum.*—Coriander is a hardy annual plant, which originated in the East.

Culture.—This plant delights in a sandy loam. It is raised from seeds, which may be sown in March, or as soon as the frost will permit, when the weather is mild and dry. The quantity of seed requisite for a bed six feet long and four feet wide, sown in rows nine inches apart, is half an ounce. The seed should be buried half an inch.

Use.—The seeds have a pleasant flavour, and, when encrusted with sugar, are sold by the confectioners under the name of *coriander comfits.* They are also used in the bitter infusions and preparations of senna, the disagreeable taste of which they completely overcome, and for various other purposes, both by druggists and distillers.

CRESS, WATER.—*Sisymbrium nasturtium.*—A genus of plants, of which the principal is the common water-cress, found in springs and brooks. It is perennial, and produces white flowers that are in bloom in June or July. Lasteyrie tells us, that, in Germany, great pains are taken to propagate the water-cress, and gives the following account of their mode of doing it: "The water," says he, "most favourable for its production, is that in which it grows naturally, and which in winter preserves heat enough to prevent it from freezing. The situation on which to form a cress plantation ought to have a little slope or inclination, because water in a state of repose, alters the flavour of the plant. Having chosen the place, it is formed into heights and hollows alternately. the latter are destined for the cresses, and the former for the culture of other plants. The size of the hollows is made to depend on the quantity of water you can bring into them, and the demand for the article to be raised. If the soil of the hollows is not sufficiently rich, better earth must be brought to amend it, and if the bottom be marshy, you throw over it some inches of sand. Your next step is to cover it with water for some hours, after which you drain and sow or plant. At the end of a few days, you let in the water, and drain as before, and continue these processes until the cresses appear, if sown, or until they have taken root, if planted. The quantity of water let in is always to be regulated by the growth of the plant; for, though it cannot live but in water, it will not bear to be long covered with it. Planting is always surer than sowing, and is therefore preferred. The epoch for this is either March or August. The distance between the plants should not be less than ten or fifteen inches. Moving the earth about their roots with the hoe, from time to time, is useful; but for the rest, (having once taken root,) no further care is necessary. A cress plantation is in full bearing the second year, and lasts a long time. When it begins to fail, it may be renewed by taking off a foot of the surface soil of the old beds and replacing it with good and fresh earth. In winter, the beds are covered more deeply with water, which protects the plant against the frost."

The same writer informs us how they manage their cress plantations near Paris. "Having there," he says, "no running water, they cultivate it in the neighbourhood of wells, and water it every day. The cress vegetates promptly, but becomes acrid in its taste. They accordingly prefer sowing to planting, because, if cut when only six inches high, and treated, in all respects, as an annual, it has least of this pungency."—*Armstrong's Treatise.*

Loudon says, "Some market gardeners, who can command a small stream of water, grow the water-cress in beds sunk about a foot in a retentive soil, with a very gentle slope from one end to the other. Along the bottom of this bed, which may be of any convenient breadth and length, chalk or gravel is deposited, and the plants are inserted about six inches' distance every way. Then, according to the slope and length of the bed, dams are made six inches high across it, at intervals; so that, when these dams are full, the water may rise not less than three inches on all the plants included in each. The water being turned on will circulate from dam to dam; and the plants, if not allowed to run to flower, will afford abundance of young tops in all but the winter months. A stream of water, no larger than what will fill a pipe of one inch bore, will, if not absorbed by the soil suffice to irrigate in this way an eighth of an acre. As some of the plants are apt to rot off in winter, the plantation should be laid dry two or three times a year, and all weeds and decayed parts removed, and vacancies filled up. Cress grown in this way, however, is far inferior to that grown in a living stream flowing over gravel or chalk."

Use.—"Water-cresses are universally used and eaten as an early and wholesome spring salad. Being an excellent antiscorbutic and stomachic, they are nearly allied to scurvy grass, but do not possess so great a degree of acrimony. They are also supposed to purify the blood and humours, and to open visceral obstructions."—*Dom. Encyc.*

CRESS, GARDEN.—*Lepidium sativum.*—The garden-cress is a hardy, annual plant, cultivated, says Loudon, since 1548; but its native country is unknown.

Varieties.—

Curled, or peppergrass. | Broad-leaved garden cress.

This plant is raised from seed, of which one ounce will suffice for a bed of four feet square.

Times of sowing, and site of the crop.—Cress should be raised three or four times every month, as it may be in demand, to have young crops constantly in succession. Allot some warm situation for early spring sowing; and, if the weather be cold, either put on a spare frame, or cover with matting between sunset and sunrise. For autumnal sowings, when cold weather is approaching, allot some warm borders, and give occasional protection. "The cress," says Loudon, "is often raised on porous earthen ware vessels, of a conical form, having small gutters on the sides for retaining the seeds. These are called *pyramids*, are somewhat ornamental in winter, and afford repeated gatherings."

Process in sowing, and subsequent culture.—"Having allotted a fine, mellow soil, to receive the seed, dig the surface, and rake it finally, preparatory to sowing, which mostly perform in small, flat, shallow drills, four, five, or six inches asunder. Sow the seed very thickly, and earth over very lightly, or but just thinly cover. Give occasional waterings in warm, dry seasons."

Taking the crop.—"To gather cress in perfection, cut them while moderately young, either clean to the root, or only the tops of advanced plants. They will shoot again for future gathering, but the leaves will be hotter, and not so mild and tender as those of younger plants."

To save seed.—"Either sow a portion in the spring for that purpose, or leave some rows of any overgrown old crop in April or May. The plants will yield seed in autumn."

CUCUMBER.—*Cucumis sativa.*—Among the varieties of this species of plants, are,

Early Green cluster,
Early frame,
Long green Turkey,
Long white Turkey,
Long prickly,
White spined,
Short prickly,
Small girkin, or West India.

Soil.—In our climate, cucumbers will grow in any soil, though not with the same degree of vigour, provided they be supplied with a sufficiency of heat, light, water, and air. It is an object with many market gardeners and others, to produce cucumbers at an early period, and for this purpose artificial heat is necessary. For early forcing, Abercrombie recommends a mould or compost, of the following materials: "one third of rich top spit earth, from an upland pasture, one half of vegetable mould, and one sixth of well decomposed horse-dung, with a small quantity of sand.

Time of beginning to force.—Abercrombie says, "Managers, who have to provide against demands for early cucumbers, must raise seedlings from twelve to ten weeks before the fruit will be required, according to the length of the days in the interval. In proportion as the entire course embraces a greater part of mid-winter, the liability of failure from obstacles in the weather will be greater. The last fortnight in January, or first week of February, is a good time for beginning to force the most early crop. In the subsequent months, both main and secondary crops may be started as required, and will come forward more freely. To have a constant succession, seedlings should be originated twice a month. As the course of forcing more coincides with the natural growing season, the length of it will be reduced to eight, seven, or six weeks." Nicol recommends the middle of January. He says, "Some begin sooner, but it is striving hard against the stream to little purpose. If the dung be prepared, and the bed be got ready, so as to sow about the 1st of February, the success will be often greater than by sowing a month earlier." Besides, cucumbers, produced altogether by the heat of dung, without the aid of the sun, are less wholesome and palatable than those which Nature affords in the due course of her operations.

Sorts.—Abercrombie recommends "the short prickly for very early fruit, and the long prickly kinds for the chief early and main summer crops." M'Phail prefers "the green cucumber with black prickles, as best for forcing. When fit for table, it runs from six to nine inches long, and, when ripe, runs to about eighteen or twenty inches long."

Choice of seeds.—"It is advisable," Abercrombie observes, "to have seed from two, at least, to four years old, in preference to newer seed, which is apt to run luxuriantly in vine, and the plants from it do not show fruit so soon nor so abundantly as those from seed of a greater age. But when seed has been kept more than four years, it is sometimes found to be too much weakened." Mr. Armstrong says, "A debate has long existed, on the preference to be given to *old* or *new* seeds, and which, like many others, appears to be interminable. The Abbé Rozier and his followers think that the most vigorous plants of all species and kinds are the best, and, accordingly, prefer new seeds, because more likely to produce such than old ones: while, on the other hand, their opponents maintain, that plants may have too much vigour, as well as too little; and that, whenever an excess of vigour exists, according to all vegetable analogy, it shows itself in the production of stems and leaves, not in that of flowers and fruits—whence they conclude, that old cucumber seeds, (like those of all the rest of the *cucurbitaceæ* family,) are better than new, because *less vigorous*. The best practical use to be made of this controversy, is to sow *old* seeds in the *spring*, when vegetation is most powerful, and *new* ones in *July*, when it begins to abate."

Forcing cucumbers.—"Towards the latter end of January, a quantity of fresh horse-dung should be procured with the litter among it, to which a small portion of sea-coal ashes may well be added. In the course of four or five days, the dung begins to heat, when a little of it may be drawn flat on the outside, and covered two inches thick with good earth; over which a bell-glass ought to be placed; and two days after, when the soil is warm, the seeds should be sown, covered with fresh mould one fourth of an inch thick, and the glass again set over it. This must be screened by a mat during the night, and in four days the young plants wiil germinate. As soon as they appear, the rest of the dung must be beaten close together into a bed for one or more lights, which bed should be three feet thick, and covered three inches deep with fine, fresh earth; the frame is then to be put on; and, during the night, or in bad weather, sheltered with mats. When the soil is hot enough, the young plants must be removed into it, and set at two inches distance, the glasses being occasionally raised to admit fresh air, and also frequently turned, to prevent the wet steam of the dung from dropping down on the plants. These ought to be watered at stated times, with tepid or luke-warm water; and, as they increase in size, should be earthed up; an operation which will considerably augment their strength. If the bed be not hot enough, fresh litter should be laid round its sides; but if it be too warm, it should be perforated with a stake to give vent to the heat; and, as soon as the bed acquires a proper temperature, the holes are to be closed up with fresh earth. When the plants begin to shoot their third or rough leaf, another bed should be prepared for them, similar to the first; and, when the soil is thoroughly warmed, they should be transplanted into it, in holes about a foot deep, and nine inches broad, filled with light, fine, fresh mould, laid in a hollow, circular form. In each of these holes four plants should be set, and shaded for two or three days from the heat of the sun, that they may strike root; after which time it will be useful to expose them to the sun and air, as often as the weather will permit. When they have attained the height of four or five inches, they should be gently fastened down to the soil, in different directions; and the branches afterwards produced ought to be treated in a similar manner, as it will much contribute to forward their maturity. In the course of a month the flowers will appear, and, shortly after, the rudiments of the fruit. The glasses should now be carefully covered during the night, and the plants gently sprinkled with water in the day time. These will produce fruit till midsummer, and may be succeeded by a second crop, which is to be raised nearly in the same manner as the earlier cucumbers, with this only difference, that the former should be sown toward the end of March, or the beginning of April, and that it requires less care and attention."—*Dom. Encyc.*

The smallest degree of heat for forcing cucumber plants, at the coldest time of night, is 58 degrees; and the greatest heat necessary in the day time is 65 degrees.

"Well preparing the dung is of the greatest importance in forcing the cucumber, and if not done before it is made into a bed, it cannot be done after, as it requires turning and watering to cause it to ferment freely and sweetly; fresh dung from the stable will require at least six weeks' preparation before it will be fit to receive the plants. A month before it is made into a bed, it should be laid into a heap, turned three times, and well shaken to pieces with a fork, and the outsides of the heap turned into the middle, and the middle to the outsides, that the whole may have a regular fermentation; and if any appear dry, it should be made wet, keeping it always between the two extremes of wet and dry. A dry spot of ground should be chosen to prepare the dung on, that the water may drain away from the bottom of the heap. The dung having been a month in heap, I make the bed as follows:—I form a stratum one foot high, of wood of any kind, but if large the better; (old roots of trees, or any other of little value will do;) this is to drain the water from the bottom of the bed; for, after a month's preparation, with every care, it will frequently heat itself dry, and require water in large quantities, which, if not allowed to pass off freely, will cause an unwholesome steam to rise, in which the cucumber-plant will not grow freely: on this bottom of wood I make the bed, four feet high, with dung, gently beating it down with a fork: this is done about the 1st November, and by the month of February, the four feet of dung will not be more than two feet thick, which, with the foot of wood at the bottom, will make the bed three feet high; this I consider a good height, for, if lower, it cannot be so well heated by linings, which is the only method of warming it in the months of February and March, as by that time the first heat of the bed will have quite declined. Having made the bed, I put on the frames and lights, which I shut close till the heat rises. I then give air night and day, sufficient to allow the steam to pass off, and once in two days I fork the surface over, about nine inches deep, to sweeten it, and if, in the operation, I find any part dry, I carefully wet it. The bed being quite sweet, I prepare it for the mould, by making the middle about eight inches lower than the sides, as the sides are liable, from the weight of the frames, to settle faster than the middle, which often causes the hills of earth to crack, by which the roots of the plants are greatly injured."—*Hort. Trans.* vol. iii. p. 147.

Mr. Cobbett says, "If you wish to have cucumbers a *month earlier* than the natural ground will bring them, do this:—Make a hole, and put into it a little hot dung; let the hole be under a warm fence. Put six inches deep of fine rich earth on the dung. Sow a parcel of seeds in this earth; and cover at night with a bit of carpet, or sail-cloth, having first fixed some hoops over this little bed. Before the plants show the *rough* leaf, plant two into a little flower-pot, and fill as many pots in this way as you please. Have a larger bed ready to put the pots into, and covered with earth, so that the pots may be plunged in the earth up to their tops. Cover this bed like the last. When the plants have got two rough leaves out, they will begin to make a *shoot* in the middle. Pinch that short off. Let them stand in this bed, till your cucumbers *sown in the natural ground come up;* then make some little holes in good, rich land, and, taking a pot at a time, turn out the *ball*, and fix it in the hole. These plants will bear a *month sooner* than those sown in the natural ground; and a *square yard* will contain thirty-six pots, and will, of course, furnish plants for thirty-six hills of cucumbers, which, if well managed, will keep on bearing till September. Those who have *hot-bed frames*, or *hand-lights*, will do this matter very easily. The cucumber plant is very tender and juicy; and, therefore, when the seedlings are put into the pots, they should be *watered* and *shaded* for a day or two; when the balls are turned into the ground, they should be *watered*, and shaded with a bough for one day. That will be enough.—I have one observation to make upon the cultivation of cucumbers, melons of all sorts, and that of all the pumpkin and squash tribe; and that is, that it is a great error to sow them *too thick.* One plant in a hill is enough; and I would put *two into a pot,* merely as a bar against accidents. One will bring more weight of fruit than two, (if standing near each other,) two more than three, and so on, till you come to fifty in a square foot; and then you will have no fruit at all! Let any one make the experiment, and he will find this observation mathematically true. When cucumbers are left eight or ten plants in a hill, they never shoot *strongly.* Their vines are poor and weak. The leaves become yellow; and, if they bear at all, it is poor, tasteless fruit that they produce. Their bearing is over in a few weeks. Whereas, a single plant, in the same space, will send its fine green vines all around it to a great distance, and, if no fruit be left to *ripen,* will keep bearing till the white frosts come in the fall.—The roots of a cucumber will go ten feet, in fine earth, in every direction. Judge then, how ten plants, standing close to one another, must produce mutual starvation!"

Mr. Armstrong has the following observations with regard to *early* cucumbers:—"To obtain these, we must have recourse to artificial heat; and with the less reluctance, as, of all plants, the cucumber is that with which it best agrees. To this end, therefore, scoop as many large turnips as you propose to have *hills;* fill these with good garden mould, sow in each three or four seeds, and plunge them into a hot-bed. The advantage of the scooped turnip, as a seed-bed, over pots or vases, will now appear; for, instead of the ordinary difficulty of separating the mass of earth and the plant from the pot which contained them, and without injury to either, we re-inter both pot and plant, and even find in the one an additional nutriment for the other. The subsequent treatment does not differ at all from that of plants sown and cultivated in the open air."—*Mem. of N. Y. Board of Agr.* vol. ii. p. 115.

Training.—To force the cucumbers into early fruit, Abercrombie directs to "stop the runners as soon as the plants have made two rough leaves: as the bud that produces the runner is disclosed at the base of the second rough leaf, it may be cut off or picked out; or, if the runner has already started, it may be pinched off close. This is called stopping at the first joint, and is necessary to promote a stronger, stocky growth, and an emission of fruitful laterals; and from these the prolific runners will be successively produced. The vines, without the process of stopping, would generally be both weaker, and so deficient in fertile runners, that they would sometimes extend two or three feet without showing fruit. When plants, which have been once stopped, have extended the first runners to three joints without showing fruit, they are to be again stopped for the purpose of strengthening the plant, and disposing it for bearing. As fertile runners extend, train them out regularly along the surface, fastening them down neatly with pegs."

Upright training.—Cucumber plants being climbers by means of their tendrils, some branchy sticks being placed to any advancing runners, they will ascend, and produce fruit at a distance from the ground, of a clean growth, free from spots and well flavoured. "Mr. J. W. of Philadelphia informed Dr. Mease, that he enriched the ground near the trunk of a peach tree, and sowed some cucumber seed, which came up very abundantly. He pulled up all the plants but one, and permitted the vine to run up the tree. It bore 150 cucumbers. The numerous creepers with which the cucumber abounds, and the result of this experiment, would seem to point out the climbing nature of the plant, and the great advantage arising from permitting it to attach itself to a frame or tree, instead of confining it to the ground."—*Dom. Encyc.*

Setting the fruit.—"The cucumber," Abercrombie observes, "bears male and female blossoms distinctly on the same plant. The latter only produce the fruit, which appears first in miniature, close under the base, even before the flower expands. There is never any in the males; but these are placed in the vicinity of the females, and are absolutely necessary, by the dispersion of their farina, to impregnate the female blossom; the fruit of which will not otherwise swell to its full size, and the seeds will be abortive. The early plants under glass, not having the full current of the natural air, nor the assistance of bees and other winged insects to convey the farina, the artificial aid of the cultivator is necessary to effect the impregnation. At the time of fructification, watch the plants daily; and as soon as a female flower and some male blossoms are fully expanded, proceed to set the fruit the same day, or next morning at furthest. Take off a male blossom, detaching it with part of the footstalk. Hold this between the finger and thumb; pull away the flower-leaf close to the stamens and anthera or central part, which apply close to the stigma or bosom of the female flower, twirling it a little about, to discharge thereon some particles of the fertilizing powder

Proceed thus to set every fruit, as the flowers of both sorts open, while of a lively, full expansion; and generally perform it in the early part of the day; using a fresh male, if possible, for each impregnation, as the males are usually more abundant than the female blossoms. In consequence, the young fruit will soon be observed to swell freely. Cucumbers attain the proper size for gathering in about fifteen, eighteen, or twenty days from the time of setting; and often in succession, for two or three months or more, in the same bed, by good culture. The above artificial operation will be found both necessary and effectual in forcing the cucumber, between the decline of autumn and May, while the plants are mostly shut under glass. In plants more freely exposed to the free air, in the increasing warmth of spring, and in having the full open air in summer, from June or July till September, the impregnation is effected mostly or wholly by nature. The male flowers, being by some ignorantly denominated false blossoms, are often plucked wholly off as useless, under a notion of strengthening the plant: but this should not be generally done. Where crowded too thick in clusters, some may be thinned out moderately; but their agency being absolutely necessary in fertilizing the females, they should only be displaced as they begin to decay, except where they are superabundant."

Principal summer crop.—"The ground being dug and smoothed, line it into squares of six feet. In the centre of each, dig a hole about fourteen inches deep; fill this with well rotted dung, and sow on it five or six cucumber seeds: cover these with mould, and, when they rise and take a rough leaf, select two to each hill, and draw out the remainder. This sowing cannot be safely made in our climate till the 10th of May. For the fall and pickling crops, you must sow the first or second week in July."—*Armstrong.*

Those cucumbers, which are sowed as late as July, will not require topping or cutting off the runners as before directed, for at this season vegetation will be less vigorous and there will be less danger of the plant running too much to vine.

Raising plants from cuttings.—"Instead of raising cucumber plants from seed, they may be raised from cuttings, and thus kept on from year to year, in the following manner:—Take a shoot that is just ready for stopping, cut it off just below the joint, behind the joint before which the shoot should have been stopped; then cut smooth the lower end of the shoot or cutting, and stick it into fine leaf or other rich mould about an inch deep, and give it plenty of heat, and shade it from the rays of the sun till it be fairly struck. By this method, as well as by that of laying, cucumbers may be propagated.

"Mearns, gardener at Shobden Court, near Leominster, propagates his cucumber-plants for a winter crop in this way, and "finds that the plants raised from cuttings are less succulent, and therefore do not so readily damp off, or suffer from the low temperature to which they are liable to be exposed in severe weather; that they come into bearing immediately, as they have formed roots of sufficient strength to support their fruit, and do not run so much to barren vine as seedlings are apt to do." He takes the cuttings from the tops of the bearing shoots, and plants them in pots nine inches deep, half filled with mould. He then waters them, covers the tops of the pots with flat pieces of glass, and plunges them into a gentle bottom heat. "The sides of the pot act as a sufficient shade for the cuttings during the time they are striking, and the flat glass, in this and other operations, answers all the purposes of bell-glasses. The cuttings form roots, and are ready to put off in less than a fortnight."—*Hort. Trans.* vol. iv. p. 411.

Cucumbers increased by layers.—"As soon as several flower-buds appear on a plant, bend the second or third joint of a branch below the blossom, fasten it firmly into the ground, and cut off the capillary point of the plant; it speedily takes root, and must be separated from the parent stock; as each root has only to supply a few fruits with nourishment, it saves room, labour and time, and affords a constant supply for eight, twelve and more months, which is not so liable to degenerate as if they were raised from a variety of seeds."—*Gleanings in Husbandry.*

Culture.—In the culture of all the crops, give proper supplies of water in dry, warm weather, two or three times a week, or every day when very warm and dry. If the heat in the hot-beds, after three or four weeks or more, be much declined, and the nights or general season remain cold, let a moderate lining of hot dung be applied to both sides; which will not only cause a reviving heat, but widen the bed for the roots and runners of the plants to extend.

Insects.—"The fly, which is often very destructive to cucumbers, melons and pumpkins, may be killed by sprinkling a mixture of tobacco water and red pepper over the vines."—*Dom. Encyc.* Sprinkle the plants with a strong infusion of elder leaves that of hops and of walnut leaves is likewise recommended; or, suspend a diamond-formed piece of white paper, shingle, or other piece of wood, by a thread, tied to the end of a stick stuck in the ground at a small distance from the hill, so that the paper shall hang directly over the hill and near the plants. The air, by constantly vibrating the paper or shingle, will have a tendency to prevent insects from alighting on the plants. The surest way, however, is to enclose the hills with frames covered with gauze, or other cloth of a light texture. The following method of making sieves, or boxes, to protect cucumber vines, melon vines, &c. against the yellow bug, &c. was communicated to the editor of the *N. E. Farmer* by Mr. Levi Bartlett, of Warner, N. H. and published in that paper, vol. ii. p. 305.

"Take a strip of pine board (about three fourths of an inch in thickness is most suitable) eight or ten feet in length, and four or five inches in width—plough one edge of it with a carpenter's plough or match plain—then mark off an equal number of side and end pieces; before sawing the side pieces, run a brad-awl through where you want to drive your nails, as it is not so likely to split, as after it is sawed. The side pieces eleven inches long—ends eight inches long. They must be of this particular size, because one yard of millinet will just cover nine boxes; or a third of a yard will make three covers. After having nailed your boxes, and divided your millinet, have some thin strips or tongues, as the carpenters call them. Press these with the edges of the covers into the groove, which fastens them much cheaper and more expeditiously than small nails. I made about twenty last season, and they effectually secured them from the yellow bug, and (by sinking the edges of them in the earth a little) from worms. But if they were of no use but to guard against insects, they would be worth having, as they keep off the cold winds, and greatly promote the growth of the vines in the early part of the season."

To save seed.—"Select some best summer fruit from good, productive plants, which permit to continue in full growth till they become yellow. Then cut them from the vine, and place them upright on end, in the full sun, for two or three weeks; when they may be cut open, and the seed washed out from the pulp; spread it to dry and harden; then put it up in papers or bags for future sowing. It will remain good for many years; and seed of three or four years' keeping is preferable for early frame crops."—*Abercrombie.*

Uses.—"Cucumbers are a salubrious, cooling fruit, and may be safely allowed to consumptive patients, as they sweeten acrid humours, at the same time are gently laxative; but being in a considerable degree acescent, and sometimes attended with flatulency and diarrhœa, such effects may be prevented by eating them with great moderation; or with the addition of vinegar and pepper, which counteract their natural coldness. If properly pickled, (without colouring them with that poisonous metal, copper, or rendering them too acrid with stimulant spices,) they are an excellent antiseptic; yet we consider them highly improper either for children or wet nurses."—*Dom. Encyc.*

CURCULIO—an insect found in apples and other fruits.—*See* INSECTS.

CURRANT.—*Ribes.*—There are several species of currants, of which the principal are the common red currant, the white currant, and the black currant.

Soil and site.—All the sorts are very hardy, will grow freely and bear plentifully, almost any where, alike in open and shady situations, by which the fruit may be obtained early in June and July, and prolonged for several months in succession till October. As to soil, the currant generally does well in any common garden ground, well tilled and recruited; it bears the greater crop in a strong loam, or improved clay, somewhat moist; the earlier in a sandy light mould, which is not poor. Previous to planting, the ground should be dug two feet deep.

The following directions for the cultivation of the currant are taken from the *Amer. Phil. Trans.* vol. i. 1st series.

"Plant them round the quarters in the garden, that they may have the benefit of the manure and culture annually bestowed thereon, which will consequently make the berries large and the juice rich. The red currant is preferable to the white, as yielding richer juice, and in much greater quantity.

"Take the most luxuriant slips or shoots of a year's growth, set them in the ground about eight inches deep, and not less than twenty-four inches distant from each other: these never fail of taking root, and generally begin to bear in two years. For the rest, let them, from time to time, be treated as espaliers, (but not against a wall,) observing to keep the roots from suckers and grass.

"The goodness of the currant depends upon their having the full benefit of the sun and air, to maturate and give the berries a proper balsamic quality, by exhaling a due proportion of their acid watery particles."

M'Mahon observes, that "The only proper method of propagating gooseberries and currants is by cuttings; suckers should never be resorted to, except in cases of necessity, for such will always produce others numerously from their roots, which carry off the nourishment, that ought to go to the support of the fruit; and, besides, they form such thickets, as to smother, and deprive them of the benefit of a free circulating air.

"The proper cuttings for planting are the shoots of the last summer's production, of straight, clean growth; they should be taken from healthy trees, and such as are remarkable, according to their kinds, for bearing the finest fruit; let each be shortened from about ten to twelve or fifteen inches long, according to its strength.

"Previous to planting, cut off every bud as close as possible to the shoot, except three, four or five, near the top; which are to be left to form the head of the plant. Some people imagine, that the buds of those parts inserted in the earth grow into roots, which is by no means the case, nature never having designed them for such; the roots, or fibres, always strike out through the clean and smooth bark, but generally a little below a bud, and sometimes at the lower extremity of the cutting, from between the bark and the wood." The cuttings may be first planted in rows, eighteen inches or two feet asunder, and about eight or nine inches apart in the rows. When they have had one or two years' growth in these rows, they may be planted out either in autumn or early in spring, where they are intended to produce fruit. Dr. Thacher directs to "let no limbs grow nearer than six inches of the ground. Prune the shrub every year, and keep it thin of wood, leaving the middle open; the limbs extended; and, when these get about three feet in length, cut off, every spring, all the last year's shoots. To cultivate on an extensive scale for the purpose of making wine, set the bushes in rows, six or eight feet between each bush, with intervals of proper width, and at regular distances for passing across the rows. It is estimated that an acre well cultivated will probably yield on an average a quantity of fruit sufficient to make one thousand gallons of wine annually. The expense of making this wine is about fifty cents a gallon.

"The common black currants are larger than the red or white, but they have a peculiar flavour, which to some persons is unpleasant; they are, however, wholesome, and afford a juice which, when made into syrup with sugar, is much esteemed in sore throats and quinsies. The officinal black currant has a small berry, but is highly valuable as a medicine when made into wine. In lung fevers, putrid fevers, and ulcerous sore throats, and in putrid dysentery, the medicinal properties of this wine are not to be surpassed."—*Thacher's Orchardist*, p. 225.

The following receipt for the manufacture of currant wine is by Dr. Green, of Mansfield, Mass.

"Let the currants be fully ripe, and freed from all leaves, webs of insects, and decayed or defective fruit; break and press out the juice, and to every gallon of juice add two gallons of water, and to every gallon of this mixture three and one fourth pounds of good clean sugar, one gill of good brandy, and one fourth of an ounce of alum pulverized. Mix well together, and put the same into a clean cask. To expedite the process, ascertain the number of gallons the cask intended for the wine will contain—calculate the proportions of the ingredients—put into the cask the juice, brandy and alum—dissolve the sugar in water, and fill the cask, and with a stick mix the whole together.

"In the month of March following, draw off the wine, adding one gill of brandy to a gallon, and the wine is excellent, and improves by age. After the wine is drawn off, the residue may be worked into vinegar, or be suspended in a thick bag, in a cool place, that the remaining wine may filter out and be saved."

A kind of wine has been manufactured from the black currant, by Samuel Wyllys Pomeroy, of Brighton, Mass. which has been much celebrated for its medicinal properties. Dr. John G. Coffin, editor of the *Boston Medical Intelligencer*, says of this wine, "It has all the good properties of the best Port, without any of its heating or constipating effects. We could name several instances, where, in great debility and exhaustion, after protracted and severe fever, and from other causes, nothing else could be thought of, or taken with pleasure or advantage, in which this wine proved grateful to the palate, and most friendly to the stomach; in which, indeed, it was the principal means of conducting the patient to health and strength."

"Its exhibition has been attended with remarkable success in the early stages of cholera and dysentery,—and again also in the later stages of these diseases, after the symptoms of inflammation or febrile excitement had ceased. It has been strikingly remedial in the low states of typhoid and bilious fever. The late Capt. Gilchrist, who for several years followed the Batavia trade, and who had always suffered an attack of the severe cholera, which proves so destructive of human life in that climate, used to say that after he had this wine with him, and took two glasses of it every morning, he escaped the disease. On one voyage, his mate, who had not taken the wine, was seized with this complaint, when a bottle or two stopped its progress. We have not room to enumerate many other morbid affections, in which this wine has proved useful. In *sore throat* it has, for many years, been considered almost a specific remedy."

CUTTINGS, *or* SLIPS.—The branches, twigs or slips of plants, shrubs or trees, may, sometimes successfully, be cut off, and set in the ground to take root and grow. The best time for this operation is from the middle of August to the middle of April; but when it is done, the sap ought not to be too much in the top; neither must it be very dry or scanty, for the sap in the branches assists it to take root.

When you intend to propagate trees for timber, or for a tall, stately growth, be very particular never to take the cuttings from horizontal branches, for they will ever have an inclination to grow in a spreading manner; always make choice of perpendicular shoots, and particularly those that terminate the branches; these will produce the straightest trees.

The power of protruding buds or roots resides chiefly at the joints, or those parts where leaves or buds already exist. Cuttings should, therefore, be cut smoothly across at an eye or joint. This cutting ought to be made in the wood of the growth of the preceding season, or in the point between the two growths. It is a common practice to cut off the whole or part of the leaves of cuttings, which Loudon says is attended with bad effects.

"Cuttings which are difficult to strike may be rendered more tractable by previous ringing; if a ring be made on the shoot which is to furnish the cutting, a callus will be created, which, if inserted in the ground after the cutting is taken off, will freely emit roots. A ligature would, perhaps, operate in a similar manner, though not so efficiently; it should lightly encircle the shoot destined for a cutting, and the latter should be taken off when an accumulation of sap has apparently been produced. The amputation in the case of the ligature, as well as in that of the ring, must be made below the circles, and the cutting must be so planted as to have the callus covered with earth."—*Hort. Trans.* vol. iv. p.558.

"The insertion of the cuttings may seem an easy matter, and none but a practical cultivator would imagine that there could be any difference in the growth, between cuttings inserted in the middle of a pot, and those inserted at its sides. Yet such is actually the case, and some sorts of trees, as the orange, ceratonia, &c. if inserted in a mere mass of earth, will hardly, if at all, throw out roots, while, if they are inserted in sand, or in earth at the sides of the pots, so as to touch the pot in their whole length, they seldom fail of becoming rooted plants. Knight found the mulberry strike very well by cuttings, when they were so inserted, and when their lower ends touched a stratum of gravel, or broken pots; and Hawkins, (*Hort. Trans.* vol. ii. p. 12,) who had often tried to strike orange trees without success, at last heard of a method, by which, at first trial, eleven cuttings out of thirteen grew. The art is to place them to touch the bottom of the pot; they are then to be plunged in a bark or hot-bed, and kept moist."

"The management of cuttings, after they are planted, depends on the general principle, that, where life is weak, all excesses of exterior agency must have a tendency to render it extinct. No cutting requires to be planted deep, though such as are large ought to be inserted deeper than such as are small. In the case of evergreens, the leaves should be kept from touching the soil, otherwise they will damp, and rot off; and in the case of tubular-stalked plants, which are in general not very easily struck, owing to the water lodging in the tube, and rotting the cutting, both ends may, in some cases, (as in common honey-suckle,) be advantageously inserted in the soil, and, besides a greater certainty of success, two plants will be produced. Too much light, air, water, heat or cold, are alike injurious. To guard against these extremes in tender sorts, the means hitherto devised is that of enclosing an atmosphere over the cuttings, by means of a hand or bell-glass, according to their delicacy. This preserves a uniform stillness and moisture of atmosphere. Immersing the pot in earth, (if the cuttings are in pots,) has a tendency to preserve a steady, uniform degree of moisture at the roots; and shading, or planting the cuttings, if in the open air, in a shady situation, prevents the bad effects of excess of light. The only method of regulating the heat is by double or single coverings of glass or mats, or both. A hand-glass placed over a bell-glass will preserve, in a shady situation, a very constant degree of heat. Whatever degree of heat is natural to the mother plant, when in a growing state, will, in general, be most favourable to the growth of cuttings."—*Loudon.*

The same writer says, "Every variety of apple may be grown from cuttings; though some with much greater facility than others. All those of the burknot and codling tribes grow as well this way as by any other, and some allege, that the trees so raised are not liable to canker, (*Hort. Trans.* vol. i. p. 120,) which is supposed to be owing to their 'putting out no tap-root, but spreading their numerous fibres from the knot or bur horizontally.' Even the golden pippin may be continued in this way, and the trees have remained seven years in perfect health, when grafts taken not only from the same tree, but from the very branch, part of which was divided into cuttings, cankered in two or three years. 'All apple-trees raised in this way,' Biggs observes, 'from healthy one-year-old branches, with blossom-buds upon them, will continue to go on bearing the finest fruit, in a small compass, for many years. Such trees are peculiarly proper for forcing, and not liable to canker.'—*Hort. Trans.* vol. i. p. 65. The cuttings are to be chosen from the young wood of horizontal or oblique branches, rather than from upright ones; from six to eight inches or more in length, with a small portion of old wood at the lower end. Cut off the tip of the shoot, and all the buds, excepting two or three next the tip or upper extremity; then smooth the sections at the lower end, and insert them three or four inches in sandy loam, pressing the earth firmly to them, watering, and covering with a hand-glass. The proper time for this operation is early in February, and the glass should not be touched, excepting to give water, till the shoots have sprung an inch or two. Shade during the mid-day sun, and begin to harden by giving air in July; finally, remove the glass in August; and in October transplant to nursery rows, or in pots, according to future intention. With the burknot tribe, all that is necessary is to plant the cuttings in a shady border, and treat them like those of the gooseberry or currant."

DANDELION.—*Leontodon taraxacum.*—This is a hardy perennial plant, which is found growing spontaneously in Great Britain and the United States. Loudon says that this vegetable, "though regularly produced in London market, is seldom or never cultivated, being generally to be found in sufficient luxuriance by the sides of hedges and dry ditches. It might easily be propagated either by seeds or roots; and, if introduced as a garden plant, should have a rich, deep soil, and be carefully tied up and earthed round to blanch it effectually. Cut off all the flowers as they appear, to prevent the dispersion of the seed, and the weakening of the plant. When salad is scarce, the dandelion might be dug up from road-sides in winter, and forced in pots like succory.

" *Use.*—The leaves in early spring, when just unfolding, afford a very good ingredient in salads. The French sometimes eat the young roots, and the etiolated [blanched or whitened] leaves with thin slices of bread and butter. When blanched, the leaves considerably resemble those of endive in taste. The root is considered an equally good substitute for coffee as chiccory, and may, like that plant, be stored in cellars and barrels, for producing winter salad."—*Caled. Hort. Mem.* iv. 138. In this country, the dandelion has, we believe, been used for greens, or pot-herbs only, and we have never known it subjected to cultivation.

DIBBLE—a tool used by gardeners and farmers in Europe, chiefly in transplanting. It consists of a stick about a foot or eighteen inches long, slightly sharpened at the end, with which a hole is made to receive the plant or seed. It may be made of the upper part of an old spade or shovel handle, sharpened a little at the lower end. The common dibble is about eighteen inches long. The long dibble, used for potatoes, is about three and a half feet long.

The following method of making holes for beans has been recommended, viz.—Take a plank of oak, of such size as a man can easily manage, by a handle fixed upright in the middle of it, and of such thickness as not to give way in working; in the under part of this plank let there be fixed wooden pegs of such length, and at such distance from each other, as may form proper holes in the ground for the beans: when the land has been properly prepared, the workman must thrust the pegs of this instrument into the ground, and proceed sideways, managing it so that there may be the same distance between the last row of holes made by the first impression and the first row made by the next, as there is between the rows of any one impression. The youngest children may be taught to follow the instrument. and drop a bean into every hole that it makes.

DILL.—*Anethum graveolens.*—Dill is a hardy biennial plant, a native of Spain, somewhat similar to fennel, but smaller. It is raised from seed sown in any of the autumnal months, or very early in the spring. Half an ounce of seed is sufficient for a bed three feet by four feet. M'Mahon directs to sow dill broad-cast on four feet wide beds, covering it, if sown in autumn, half an inch, and if in spring, a quarter of an inch deep: when the plants come up, thin them to six inches distance, and the same season they will perfect their seeds; which, if any are suffered to shed, will not fail to come up plentifully the next year. The seeds and leaves of this plant are used for giving a flavour to pickles, and also occasionally in soups and sauces. It is also used in medical preparations.

DRAINS.—Drains used in agriculture may be divided into two kinds, open and covered. They should be of a size and depth proportioned to the extent of the tract which it is wished to drain, and the probable quantity of water for which they are designed to be channels. They should, generally, be carried through the lowest and wettest part of the soil. It is a rule in making drains, to begin at the lowest place, and work upwards, by which means the water will pass from the workmen, and point out the level. The mud and other materials, which are dug out of a ditch or drain, should not be suffered to lie in heaps by the side of the ditch, but should be spread as equally as possible over the surface of the drained land. In some cases, it will be expedient to transport the earth taken from ditches to the farm-yard or the hog-pen, to form a part of that layer, which good farmers generally spread over those places, to imbibe liquid manure, or make into compost. In many instances, it is asserted, that the earth dug out of ditches, is worth enough for manure, to pay for the expense of digging the ditches.

Open drains often answer the purpose not only of conveying off superfluous water, but serve for enclosing fields. But they make a hazardous and inconvenient fence without the addition of a bank, hedge, or railing. The *Farmer's Assistant* says, "When a ditch is made for a fence, it ought to be four feet wide at the top, one or less at the bottom, and about two and a half deep; with the earth all thrown out on one side, and banked up as high as possible." Sir John Sinclair states, that "it is a general rule, regarding open drains, with a view of giving sufficient slope and stability to their sides, that the width at top should be three times as much as that which is necessary at the bottom; and, in the case of peat mosses, or soft soils, it should be such as to allow the water to run off without stagnation, but not with so rapid a motion as to injure the bottom."

The American editor of Sir John Sinclair's *Code of Agriculture* observes, that "The most expeditious, effectual, and economical mode of making a drain would undoubtedly be, to use oxen, and a *scraper*, or ox-shovel, as it is sometimes called,—an instrument well known in this country in the making of roads. In some cases, this mode might not answer, as in very miry grounds, and lands just cleared of timber. But where lands are very miry, if the process is begun at the outlet of the water,—and there, indeed, it ought always to be begun,—the next adjoining portion will, generally, be made so dry as to allow being trodden upon in a proper season; and in this way a drain may by degrees be carried on towards the centre. In nineteen cases out of twenty, drains may probably be effected in this mode. Where the ground will admit of it, two men and a boy, and two yoke of oxen, will accomplish more business of this sort in a day, than half a dozen men in the same time, with only spades and shovels. Wherever the labour of cattle can be substituted in this country for human labour, policy requires it to be done. The surface of wet and miry land is usually full of inequalities; if a *scraper* is employed in draining them, the earth taken from the drain is easily landed in any hollow spot which needs to be filled; and if there are no such hollows, or they have already been filled, the earth may be spread over the surface in such a manner as to do the most good. If the earth is not wanted for other purposes, it is recommended to drop and spread it, if practicable, in such a manner as to leave the general surface of the land sloping towards the drain, that the water may the more readily incline towards it, and pass off. At some distance below the surface, in peat grounds, there is usually found a hard stratum of earth, called, in the common language of our farmers, *hard pan*. The hard pan, if ploughed into, scraped out, and spread on the surface, would greatly improve the texture of such soils. This furnishes another argument in favour of using a scraper in draining, for in no other way can the upper earth, taken out of the drains, be so cheaply removed, and put on the adjoining; nor in any other way can the hard pan be so easily broken up and carried off; nor in any other way, oftentimes, can suitable earth be so well obtained, for the purpose of spreading it over the surface with a view to improve the texture of the soil. If the object be to pile the earth from the drains into heaps, with a view to composts, this purpose is completely accomplished by means of the scraper."

To make a covered drain, dig a channel between thirty and thirty-six inches wide at the top, and six inches, or the breadth of a spade, at the bottom, and three feet deep, giving it just descent enough to make the water run briskly. Fill it half full or more of small stones, thrown in at random, and cover them with a layer of straw, leaves, or the small branches of trees with the leaves on them; then fill it up to a level with the surface, with the earth that was thrown out.

In forming small drains, chiefly for retentive soils, the common plough may be used. A mode described in *Young's Annals of Agriculture*, from very ample practice, is his: he says, when he has marked the drains in a field, usually a rod asunder, he draws two furrows with a common plough, leaving a balk betwixt them, about fifteen inches wide; then, with a strong, double-breasted plough, made on purpose, he splits that balk, and leaves a clean furrow fourteen or fifteen inches below the surface; but where the depth of soil requires it, by a second ploughing he sinks it to eighteen or twenty inches; it is then ready for the land-ditching spade, with which he digs, fifteen inches deep, a drain as narrow as possible. But the method followed by some farmers, who do not possess ploughs made on purpose for the work, is this: with their common plough, drawn by four or five horses, and usually stirring about four or five inches deep, they turn a double furrow, throwing the earth on each side, and leaving a balk in the middle. This balk they raise by a second bout, in the same manner; then they go in the open furrow twice, with their common double-breast plough, getting what depth they can. After this, they shovel out all the loose mould and inequalities to the breadth of about a foot; and thus having gained a clear, open furrow, the depth varying according to the soil and ploughs, but usually about eight or nine inches, they dig one spit with a draining spade sixteen inches deep, thus gaining in the whole twenty-four or twenty-six inches. But as this depth is seldom sufficient, when necessary, they throw out another, or even two other spits, which makes the whole depth from thirty to forty inches.—*Loudon.*

Turf-covered drains may be made as follows:—Turn up a deep furrow with a strong plough, clear the sod from the earth thus turned up, reduce it to about three inches in thickness, and then place it in the furrow from whence it was taken. The grassy side being placed uppermost, there is a hollow beneath, sufficient to discharge a considerable quantity of surface water, which readily sinks into it. This mode of draining is used on the sheep farms of the Cheviot Hills in England, and is recommended by Sir John Sinclair. It would not answer, however, in lands exposed to the tread of heavy cattle, as they would be apt to push their feet through a covering of turf of no more than three or four inches. Perhaps, in a few years, the verdure would thicken, and the sward strengthen over drains of this kind, so that there would be nothing to apprehend from the tread of the heaviest animals.

Cultivation of drained land.—It is well known that swamps, marshes, and other low lands are commonly places of deposit for the lighter and more fertile parts of the soil, washed from the neighbouring hills. Many marshes are in fact intervale land, naturally too wet for profitable cultivation. Wet lands, which receive the wash of higher grounds of a tolerable quality, may be expected to be worth considerable expense in draining. A bog, however, on the top of a hill, not overlooked by high ground, we should suspect of barrenness, and would not be at great expense in draining it, without examining and analyzing the soil in various parts, and becoming satisfied of its fertility. But a drained marsh, which can be flooded at the will of its owner, by means of a dam at its outlet, with water which has washed the neighbouring uplands, may be considered as inexhaustible, and, perhaps, had better be appropriated to the raising of hemp. That plant exhausts the soil very much, and it would, therefore, be good economy to raise it where the land can be recruited without manure from the farm-yard, &c. If the land is rich, not very dry, or water can be set back in the ditches, in a dry time, to within three or four feet of the surface, it will be quite an object to introduce fowl meadow, (*Agrostis stricta.*)

It is often advisable to let drained lands lie over one summer to ferment and rot, before any attempt to cultivate them. Flooding them completely in the winter, and drawing the water quite off rather late in the spring, will likewise assist in rotting the sod.

DUCK.—"Ducks are excellent *vermin pickers*, whether of caterpillars, (such as are within their reach,) slugs, snails and others; and ought to be turned into the garden one or two days every week, throughout the season. Never keep them longer in than two or three days at a time, else they tire of their food, and become indolent. While here, they should be offered no food, but may have a little water set down to them, if there be no pond or stream in the garden.

"They are very fond of ripe strawberries or gooseberries; and, while they can get at these, will seek little after snails, or other insects; but they are most useful before these come into season for them. There are some kinds of vegetables they have a liking to, and on which they will fall, if vermin be any wise scarce; therefore, when this is perceived, they should be turned out. Never turn them into the garden in the time of heavy rains, or in continued wet weather; as, in that case, and particularly if the soil be stiff, they patter and harden the surface, to the great injury of small crops, and rising seeds."—*Nicol.*

EGG-PLANT.—*Solanum melongena.*—"There are two varieties of this plant, the white-fruited and the purple, cultivated for culinary purposes; the latter kind is preferable, and, when sliced and nicely fried, approaches, both in taste and flavour, nearer to that of a very nice fried oyster, than, perhaps, any other plant.

"This delicious vegetable may be propagated by sowing the seed on a slight hot-bed, the beginning of April, or in March; and towards the latter part of May, they should be planted in a rich, warm piece of ground, at the distance of two feet and a half asunder, every way, for the purple, or two feet for the white kind; and if kept clean, and a little earth be drawn up to their stems, when about a foot high, they will produce plenty of fruit. Or, the seed may be sown about the end of April, on a warm border, and planted out finally the beginning of June; but these will be rather late, and not produce fruit so abundantly, in the Middle or Eastern States, as by the former method."—*M'Mahon.*

ELDER.—*Sambucus nigra.*—This shrub grows plentifully in most or all parts of the United States, and is too well known to need description. Something, however, may be said with regard to its uses, some of which may not be so well known.

"This tree, professor Martyn observes, is a whole magazine of physic to rustic practitioners, nor is it quite neglected by more regular ones. An excellent healing ointment is made of the green, inner bark, which is also purgative in moderate, and diuretic in small doses. A decoction of the flowers promotes expectoration and perspiration, and they give a peculiar flavour to vinegar. The flowers are reported to be fatal to turkeys, and the berries to poultry in general. No quadruped will eat the leaves of this tree; notwithstanding it has its own *phalæna* and *aphis*. The wood is used by the turner and mathematical instrument maker; and is made into skewers for butchers, tops, angling rods, and needles for weaving nets."—*Loudon*.

Willich says, " The leaves are eaten by sheep, to which it is of great service, when diseased with the rot; for, if placed in a situation where they can easily reach the bark and young shoots, they will speedily cure themselves."

The expressed juice of elder leaves, it is said, will kill skippers in cheese, bacon, &c.; and strong decoctions of it, poured or sprinkled over plants, are said to be fatal to insects.

In Europe, this shrub is sometimes propagated, but in this country, to destroy it is commonly an object of more consequence to the cultivator. It was remarked by the Rev. Dr. Jared Elliot, in his *Essays on Field Husbandry*, that " Elder bushes are stubborn and hard to subdue, yet I know by experience that mowing them five times a year will kill them."

To make elder-berry wine.—One bushel, when picked from the stalks, produces three gallons, or upwards, of berries; put these to seven gallons of soft water; after standing forty-eight hours, put them into the copper, let them boil one hour, then press the juice through a coarse cloth; then put the liquor into your copper again, with twenty pounds of raw sugar, half a pound of Jamaica ginger, bruised, one ounce of cloves, and one ounce of allspice. Boil the whole together one hour, then put it into a tub, and, when cold enough, add some good yest spread on a toast, and in two days put it all into a cask, and lay the bung lightly on for two months; then add one quart of brandy; this wine will keep for several years.

ELECAMPANE.—*Inula.*—This plant is found wild in moist pastures, both in Europe and America. It may be propagated either by seeds, sown in October, or offsets, which, if carefully taken from the old roots, with a bud or eye to each, will take root freely. M'Mahon directs to set such offsets in rows, about a foot asunder, and the same distance plant from plant in the rows. They will be fit for use after two years' growth, but will abide many years if permitted to stand. But young roots are preferable to those which are old, as they become tough and stringy by age.

Use.—This is a plant of some repute in medicine. It is said to strengthen the stomach and promote perspiration. An infusion of the roots, sweetened with honey, is useful in hooping cough. If liberally taken, they are diuretic, and said to be of great service in removing visceral obstructions. A decoction of this plant has been employed by farmers for the cure of scab in sheep; and externally applied for removing disorders of the skin. The fresh roots beaten in a mortar, with new butter, and applied externally, are said to cure the itch, scald head, &c.

ENDIVE.—*Cichorium endivia.*—The endive is a hardy annual, a native of China and Japan, and introduced into Great Britain in 1548. The varieties are

Green curled leaves, | White curled leaves, | Broad-leaved Batavian.

Estimate of sorts.—"All the sorts are eligible for culture; but allot, principally, the green curled for the main crops of autumn and winter endive, this being of the most stocky, full growth, and hardiest to stand severe weather. As to the others, allot a smaller portion of the white curled for early summer and autumn use: of the broad-leaved kind, provide a moderate crop for autumn, till November or December; being by some esteemed preferable for stews and soups, though not much used in salads."

Propagation.—All the varieties are raised from seed, of which, for a seed-bed four feet by ten in length, half an ounce is sufficient.

Times of sowing.—"The proper seasons are, May, for a smaller early crop; and principally June and July to the beginning of August; for full and successive crops, all autumn and winter, till the following spring. For, if sown earlier than the middle of May, or beginning of June, they will mostly run to stalk the same season, before attaining mature, useful growth. If any are required for early young summer endive, sow only a small portion of the white curled in April or May, as the plants will soon run to seed. In the middle, or towards the end of May, you may begin sowing moderately of the different sorts; but do not sow fully til nearly the middle of June, that the plants may stand without running to seed the same year. About the twelfth and twenty-fifth of that month, also at the beginning and middle of July, sow the main and successive crops, for autumn and winter; and a finer smaller sowing about the beginning of August, for late supplies in the end of winter and following spring.

Culture in the seed-bed.—"Sow each sort separately in beds of rich, mellow earth, in an open situation, scattering the seeds thinly, and rake in the seed. When the plants are up an inch or two in growth, thin them moderately, where in clusters, that they may have room to grow stronger and stocky, for transplanting. But if a portion are sown in soil of sufficient depth, and thinned to the distances mentioned under *transplanting*, instead of being moved, they may be expected to produce heads of the finest kind, under the same culture as is given to the others.

Transplanting.—" As the plants attain a sufficient growth, being from four to six inches high, or in a month or five weeks from the time of sowing, proceed to transplant the successive crops. The ground should be light and rich, on a dry sub-soil. Dig it a full spit deep; set in shallow trenches or drills the depth of a hoe, endive blanches with less trouble than if inserted on a level surface. The lines may be fifteen inches asunder; the plants ten or twelve inches distant in the lines. Drawing the strongest first, plant out portions from June to October; but the principal removals will fall in August, in which month three different plantings may be made for succession; also for a general winter crop, at the beginning of September. While the plants are in hand, trim the extremities of the leaves, and shorten the tap roots a little; water at planting, and moderately afterwards, once in two days, if the weather be dry, till the plants take root. At the end of September, and in October, likewise, plant some in a warm, dry border, to stand the winter more effectually. Also, in the last fortnight of October or beginning of November, it would be proper to insert some stout plants, thickly, on a bank of dry, light soil, raised a foot or two behind, sloping to the south. Thus they will remain drier in winter, and will be preserved more securely from rotting in that season. The bed might also be defended, in very severe weather, with frames and glasses, or with an occasional awning of mats or sail cloth.

Blanching.—" As the transplanted crops advance to full growth, stocky and full in the heart, some should have the leaves tied up every week or fortnight, to blanch or whiten, and to render them tender, crisp, and mild-tasted. Perform this in dry days, and in winter, when the weather is dry without frost. Using strings of fresh bass, or small osier twigs, tie the leaves regularly together, a little above the middle, moderately close. If the soil be light and dry, earth them up half way; but if moist, merely tie them.

The two curled sorts, if neatly earthed up, will blanch pretty well without being tied. The Batavian, from its loftier, looser growth, in every case hearts and blanches better with a bandage. The blanching will be completed sometimes in a week, when the weather is hot and dry; at others, it may take a fortnight or three weeks; after which the endive should be taken up for use, or it will soon rot, in six days or less, especially if much rain fall. To save the trouble of tying, this esculent is also occasionally blanched by setting up flat tiles, or boards, on each side of the plants, which, resting against each other in an angular form, and confined with earth, exclude the light. Further, endive may be blanched under garden-pots or blanching-pots, in the manner of sea-kale. In the heat of summer and autumn, tying up is best; but in wet or cold weather, to cover the plants preserves while it blanches them.

Occasional shelter.—" At the approach of severe frost, cover some thickly with straw litter. Also plunge a portion into a raised bank of light, dry earth, under a glass case, or covered shed, open to the south. Protect with litter in rigorous weather; but uncover, and give plenty of air, on mild days.

To save seed.—" Allot some of the strongest old plants in February or March, if any remain; otherwise, sow seed in March or April, and transplant or thin the plants to twelve or fifteen inches distance. They will shoot, and the seed ripen in autumn.

Use.—" It is cultivated for the stocky head of leaves, which, after being blanched to take away the bitter taste, are used in salads and stews."—*Loudon.*

ESPALIERS.—Espaliers in horticulture are rows of trees, planted in gardens or hedges, and trained to rails, lattices or trellises of wood work, &c.

The trees chiefly planted for espaliers are, apples, pears, and plums. Espalier rails are substitutes for walls, and which they so far resemble, that the trees are regularly spread and trained along them, are fully exposed to the light, and, having their branches fixed, are less liable to be injured by high winds. They may be made of wood, cast iron, or wire and wood.

" An espalier has this advantage over a wall tree, that, as being wholly detached, the branches have liberty to form fruit spurs on both sides, which, in the wall tree cannot be effected but on one; in fact, common fruit walls are unnecessary in the United States, except in the Eastern and some of the Middle States, where they are useful in forwarding, to due perfection and flavour, some late kinds of superior peaches, grapes, and other late fruits; but when walls are built for other purposes, and are conveniently situated, advantage ought to be taken of them for raising fruit; observing to suit the various kinds to the various aspects."—*M^c Mahon.*

FENNEL.—*Anethum fœniculum.*—"The fennel is a perennial plant, naturalized in England, and found in chalky soils. The plant rises with finely cut leaves, and capillary leaflets, on a smooth, dark-green, branched, tubular stalk, to the height of five or six feet. On the summit are produced umbels of gold-coloured flowers, in July and August. The whole plant is aromatic, and has long been an inmate of the garden.

"*Use.*—The tender stalks of common fennel are used in salads; the leaves, boiled, enter into many fish sauces; and, raw, are garnishes for several dishes. The blanched stalks of the variety called *finochio* are eaten with oil, vinegar, and pepper, as a cold salad, and they are likewise sometimes put into soups.

"*The varieties* are—

The common, or sweet,
Dark-green-leaved,
Dwarf, or finochio. This variety is characterized by a tendency in the stalk to swell to a considerable thickness. This thickened part is blanched by earthing up, and is then very tender. 'Owing to the peculiar nature of this variety,' Neill observes, 'it is more tender than the common fennel, and often perishes in the course of the winter. Misled by this circumstance, several horticultural writers describe it as an annual species, under the appellation *A. segetum.*'

"*Propagation.*—They are all raised from seed, of which half an ounce is sufficient for a seed-bed four feet by six feet. Sometimes, also, they are raised from offsets from the old plants, where only a few are wanted. 'Sow in the spring in light earth, either in drills from six to twelve inches apart, or broad-cast and raked in. When the plants are three or four inches high, thin or transplant a quantity fifteen inches asunder. As the roots of old plants divide into side offsets, these may be slipped off in spring, summer, or autumn, and planted a foot apart. They will produce immediate leaves for present supply, and in continuance; or, for an immediate larger supply of leaves, you may procure some established full roots, and plant as above: let them be well watered.'

"*Subsequent culture.*—'The same plants remain several years by the root; but as fennel sends up strong stems for seed in summer. these, or a part of them, should be cut down, to encourage a production of young leaves below, in succession. It is apt to spread more than is desirable, if suffered to seed. The swelling stems of the finochio variety, when of some tolerable substance, should be earthed up on each side five or six inches, to blanch them white and tender. This will be effected in ten days or a fortnight; and, by successive sowings, or cutting down plants during summer, successive crops of blanched stalks may be had from June to December.'

" *To save seed.*—'Permit some of the best stalks to shoot; they will produce large umbels of seed in autumn.'—*Abercrombie.*"—*Loudon.*

FLOWERS, ORNAMENTAL.—Should the agriculturist have no taste for ornamental gardening, yet such is the laudable taste of the fair daughters of America, at the present day, that there are but comparatively few, that do not take an interest in a flower garden. And this alone is a sufficient reason for the publication of these remarks.

Horticulture, as it respects ornamental gardening, is one of the most innocent, the most healthy, and, to some, the most pleasing employment in life. The rural scenes which it affords are instructive lessons, tending to moral and social virtue; teaching us to "look through nature up to nature's God."

Flower gardens were ever held in high estimation by persons of taste. Emperors and kings have been delighted with the expansion of flowers. "*Consider the lilies of the field,*" said an exalted personage, "*how they grow;*" for Solomon, when clothed in the purple of royalty, "*was not arrayed like one of these.*" Nature, in her gay attire, unfolds to view a vast variety, which is pleasing to the human mind; and consequently has a tendency to tranquillize the agitated passions, and exhilarate the man, nerve the imagination, and render all around him delightful.

The cultivation of flowers is an employment adapted to every grade, the high and the low, the rich and the poor; but especially to those who have retired from the busy scenes of active life. Man was never made to rust out in idleness. A degree of exercise is as necessary for the preservation of health, both of body and mind, as food. And what exercise is more fit for him, who is in the decline of life, than that of superintending a well ordered garden? What more enlivens the *sinking mind*? What more invigorates the *feeble frame?* What is more conducive to a *long life?*

Floriculture is peculiarly calculated for the amusement of youth. It may teach them many important lessons. Let a piece of ground be appropriated to their use—to improve in such a manner as their inclinations shall dictate—to cultivate such plants as are pleasing to their taste; and let them receive the proceeds. Let order and neatness pervade their little plantations. Let them be instructed, that nothing valuable is to be obtained or preserved without labour, care, and attention—that as every valuable plant must be defended, and every noxious weed removed, so every moral virtue must be protected, and every corrupt passion and propensity subdued.

The cultivation of flowers is an appropriate amusement for young ladies. It teaches neatness, cultivates a correct taste, and furnishes the mind with many pleasing ideas. The delicate form and features, the mildness and sympathy of disposition, render them fit subjects to raise those transcendent beauties of nature, which declare the "perfections of the Creator's power." The splendid lustre and variegated hues (which bid defiance to the pencil) of the rose, the lily, the tulip, and a thousand others, harmonize with the fair, fostering hand that tends them—with the heart susceptible to the noblest impressions—and with spotless innocence.

Situation.—As to the proper situation for a garden, it is not always in our power to choose. A level plat, however, is to be preferred; for, if there be considerable descent, the heavy rains will wash away the soil. A southern aspect, sheltered from the north and north-west winds, is a proper situation for most plants. An inclination towards the north, or west, or any point between them, should, if possible, be avoided.

Soil.—The natural soil should be a deep loam, which is easily made rich by old, rotten manure. But here, again, it is not always in our power to choose such a soil. In such cases we must endeavour to imitate—we must dig and carry off—and bring on loam, &c. and make a rich soil. The ground ought to be well pulverized with the plough or the spade. In a word, what is wanted, is a deep, rich soil, natural or artificial, not too wet, nor too dry.

The ground in a garden must be kept rich, and often stirred. It ought to be manured every year. A compost made of decayed vegetables, yard manure, rotten leaves, ashes, and mould from any place, where it can be had, is proper for a garden. A garden should be well defended, by a high and tight fence, especially on the north and west.

Sowing and planting.—In the first place, the ground must be made fine, as well as rich. It should be moderately moist, not too wet, nor too dry. The beds should be raised three or four inches above the level of the walks; and the seeds ought, by all means, to be sown in rows, ten or twelve inches apart; and the earth should be moderately pressed upon them.. The time for sowing either annual, biennial, or perennial flower-seeds, is in the months of April and May, according to the state of the season. Very small seeds may be covered with fine earth nearly half an inch; larger ones in proportion to their size; and those as large as a pea, to the depth of an inch, or a little more. Seeds of delicate plants should be planted in flower-pots, and the earth kept moderately moist, by watering with a watering-pot, that is finely pierced, and does not pour heavily; or the pot may be placed in the pan, and water supplied at the bottom. The pots should be exposed to the sun, except from eleven, A. M., to two, P. M., when a powerful sun might scorch the vegetating seed. The mould for pots should be rich, and sifted through a coarse sieve, made for that purpose.

Transplanting.—The best time, perhaps, for transplanting annual plants is in June, and for biennial and perennial plants in September or the beginning of October, remembering, in all cases, to take a sufficient quantity of earth, with the roots, where it can be done with propriety. Scoop trowels will be found useful instruments in this operation, which ought not to be done when the ground is very wet, but when it is only moderately moist, and in a cloudy day, or a little before the evening, or previous to a shower. If the ground be dry, shading the plants, and a little water, may be necessary, for a short time. In case the roots should be small, or injured, or destitute of earth, when taken up, they must be shaded during the day, until they have gained strength. In placing a plant where it is to stand, great care is necessary to place the roots in their natural position, to bring the earth in contact with them, and to press the earth moderately about them.

If the plant is to be planted in a pot, place a piece of earthen ware over the aperture in the bottom, that the superabundant water may drain off, which would otherwise saturate and rot the roots. The pots should be nearly filled with rich earth, and the plant carefully placed in the centre, and the mould brought into contact with the roots, and moderately pressed.

Cultivation.—The plants must be properly thinned while they are small; for, if left too near each other, they interfere, grow slender and weakly. As the plants increase in size, remove the weakest, and so continue to do, until they stand at a proper distance. All plants of every description should stand at such distance one from the other, as that the air may circulate freely about them, and that the sun may have its proper influence in bringing them to perfection. The air and sun are absolutely necessary in perfecting the growth of plants, which never ought to stand so near as to interfere with each other.

The earth ought to be kept loose about the plants, and for this purpose a prong-hoe is a useful instrument. Moving the earth should be done in dry weather; as ploughing, digging, or hoeing in wet weather, leaves the ground in a bad, clammy state. In a dry season, stir the earth about plants, and spread old coarse hay or straw about them. Old hay spread about the plants keeps the earth cool, and retains the moisture, and is very useful to vines.

Weeds of every species must be removed, and the sooner the better after their appearance. No weed should be suffered to flower in a garden, nor in its border. The beauty of a garden depends very much on order and neatness—a place for every thing, and every thing in its place—keeping out the weeds, and removing every thing when decayed. No garden can show to advantage, where weeds are permitted to usurp the place of useful plants.

Shrubbery in general requires some attention. Prune out all inferior, dead, and decaying branches. Keep down the suckers, and clean out the weeds, and stir the earth about the roots occasionally. Order and neatness add a lustre to every thing.

Cuttings are pieces, cut from trees, shrubs, or plants of the last growth, and should generally retain a small piece of the growth immediately preceding the last or ripened wood. They should be taken when the sap is active, and about six joints or buds are sufficient. Cut them with a sharp knife, transversely and smoothly, near a joint or bud of the previous growth, or between the two last growths. Set them in rich, moist ground, in a shady place, leaving two or three joints or buds above the surface. If the weather be dry, water them, and place old hay about them, to keep the earth moist. Such parts of herbaceous plants should be taken for cuttings, as do not show a tendency to flower. If the cutting be planted in a flower-pot, place the pot in the earth, in a shady place, and cover the cutting with an inverted glass, for a short time, to preserve a moist atmosphere about it. If they send out roots, they will also send out branches, otherwise they die.

Layers are branches left on the parent plant or shrub, and bent down, and fastened several inches (according to the case) below the surface of the earth, leaving the extreme part out of the ground. A flat stone, placed on the earth immediately above the layer, is useful to keep the earth cool, and to retain the moisture. When they have taken sufficient root, sever them from the parent stock, and at any proper time they may be transplanted.

As to the cultivation of herbaceous plants and shrubs in pots, a few directions may be necessary.—The earth should be kept moderately moist. The mould on the top should be dry before additional water be given. The pots should be frequently turned round, or the plants will grow crooked by reason of their inclining towards the sun or light. If the plants are to stand in pots, year after year, the balls of earth should be taken out in October, and the sides and bottom shaved off with a sharp knife, to the depth of an inch, more or less, according to the size, and then replaced, and the pot filled with some fresh compost or very rich earth made very fine. Two thirds of good rich earth and one third of old rotten yard-manure, well incorporated, make a good compost for most plants, except the bulbous-rooted, which require some sand.

Protection during the winter.—Herbaceous plants in general require some slight covering during the severity of a northern winter. Pine boughs, straw, old coarse hay, or leaves, are useful for this purpose, and may be removed about the first of April or before, if the weather will permit.

BULBOUS FLOWER ROOTS.—No class of plants is more interesting, perhaps, than this; yet merely an outline of the mode of cultivation must suffice.

Situation.—A southern exposure, not too wet nor too dry, sheltered from the north and north-west winds, is proper for most bulbous roots.

Soil.—Bulbous flower roots do best in a soil composed of one third sand, one third old rotten yard-manure, and one third good rich earth, well pulverized and mixed together; and if a small proportion, say about one fourth, of decomposed vegetable mould, from a wood or swamp, be added, it will have a good effect by giving additional lightness to the soil. The beds should be raised four or five inches above the level of the walks, that the superfluous moisture may run off. Some additional sand, strewed in the trenches made for the roots, before and after planting them, is recommended.

Transplanting.—The proper season for transplanting most bulbous roots, is in August, September, and October. The only advantage to be gained, by taking up bulbs, after blooming, (tulips excepted,) is either to divide the roots, when too numerous, or to renew a worn out soil, neither of which can occur oftener than once in three or four years. Tulips and hyacinths, when taken up after blooming, and after the foliage is decayed, may be kept from the ground till the middle of October.

Delicate and tender bulbs, as the Feraria tigrida, &c. may be planted in pots in November, or they may be kept in dry sand until April, (which is best,) and then planted in pots or open ground. In either case they must be secured from the frost. As to tulips and hyacinths, in order to preserve their beauty in perfection, the nicer varieties should be taken up, air-dried, and replanted annually.

Depths and distances.—Large bulbs, as the hyacinth and the large lilies, should be planted to the depth of four inches; tulips, Narcissus, jonquils, three inches; crocus, Feraria tigrida, gladiolus, &c. two inches, always measuring from the top of the bulb. The polyanthos Narcissus may be planted five or six inches deep. The rows should be ten or twelve inches asunder, and the roots placed from three to eight inches apart, according to the size of the plants.

Protection during winter.—Bulbous roots should be covered in November with tanners' bark, leaves, rubbish of the garden, or some light substance, to the depth of three inches, to prevent the bad effects of severe frosts. Polyanthos Narcissus is more tender than hyacinths, and ought to be covered six or seven inches. The covering must be removed early in the spring.

Management of bulbous roots in pots.—Hyacinths, polyanthos Narcissus, double Narcissus, and jonquils, make a beautiful appearance, during winter, in the parlour.

Bulbs intended for blooming in the winter, should be potted in October or November, and left out until it begins to freeze, and then placed in a warm room. They will want, occasionally, a little water, until they begin to grow, then they should have both air and sun, and plenty of water from the saucers or pans, underneath the pots.

Those bulbs, as hyacinths, &c. which are designed to flower in glasses, should be placed in them towards the end of November, the glasses being first filled with rain-water, so that the bulbs may come in contact with it. Then place them in a dark place for a few days, to promote the shooting of the roots, after which expose them to the light and sun, and change the water as often as it becomes impure, not suffering it to freeze.

Bulbous-rooted plants, growing in pots, should be frequently turned round, as they will incline to the sun or light—the earth on the top should be suffered to dry, before the next watering—when the plants have done growing, give them little or no water. If the plant be so managed the present year, as not to have a flower-bud formed in miniature, there will be no flower in the next. If the leaves be well grown, and the plant properly exposed to the air and sun, then the sap will be duly prepared by them, and an embryo flower will be formed in the bulb. All bulbs, in a certain period of the year, are dormant; this state commences when the foliage begins to decay, after blooming—then lessen the supplies of water, and in a little time cease to water altogether, until the season of regermination returns. The bulbs, during this time, may be kept in the pots in a dry, shady place, and in the same temperature as that in which they delight to grow.

Generally, it is best to take the bulbs out of the pots, after the decay of the foliage, and repot them in a fresh soil or compost, (mentioned above for bulbs,) a week or two before the period of regerminating; at which time water will be necessary, and may be applied at the bottom, pouring into the pan, or it may be applied by a small watering-pot, that pours lightly, on the top, so as to keep the earth moderately moist. The earth should be kept loose on the top, and the water used for the plants ought to be rain water, or such as has been exposed to the sun. Water that has been filtered through a rich compost is very useful

The proper time to take up bulbous roots is in about month after blooming, when the foliage has a yellowish decayed appearance. Cut off the stem and foliage within an inch of the bulb, leaving the fibrous roots attached to it. After they are air-dried, place them singly in paper or dry sand, until replanted, or spread them on shelves in a dry apartment.

Flowers are divided into *annuals*, which flower and die the year they are sown *biennials*, which flower the second year, and then die; and *perennials*, which do not, generally, flower the first year, but die down to the ground annually, and spring up again every succeeding spring for a number of years.

In the following alphabetical list, flowering trees and shrubs are included. We shall select such plants, shrubs, and trees, as are of easy cultivation, generally hardy—such as have singular foliage, fragrant odours, or beautiful flowers—such as make a handsome appearance. As to placing them in the garden, or elsewhere, to advantage, we leave it to the convenience and taste of the proprietor.

Althæa frutex—*Hibiscus Syriacus*—is a beautiful shrub, but requires a warm, sheltered situation in the Northern States. It is easily raised from the seeds, sown in the spring. The young plants must be well protected during the winter.

Almond, double-flowering—*Amygdalus pumila*—is a shrub, which is, generally, in the spring, loaded with beautiful flowers, resembling small roses. When in bloom, it is not inferior to any shrub whatever, and makes a fine appearance in a border. It is propagated by suckers.

Amaranthus superbus—annual—superb—flowers late—tender—plant the seed in May, or before, if the season be mild.

Amaranthus tricolor.—This plant is annual, and is admired for its beautiful foliage, red, green and yellow—tender. The seed is found in little tufts about the stalk, and should be sown in May, or before, if the weather be warm.

Animated oats—*Avena sensitiva*—are annual, and resemble the common oats, while growing. The seeds are clothed with a stiff down, and have appendages like the legs of some insect, with apparent joints. They are affected by the changes of the weather, and, of course, are continually moving. If they be wet, they will turn over several times, and twist about. If wet, and held to a lighted lamp, they exhibit such motions of apparent agony, as an insect would, placed in a like situation.

Aster, China.—It is annual, and produces many flowers, beautiful to the sight. There are many species, as red, white, purple, striped, quilled, &c. The seed should be sown early in the spring. It flowers late in the season, and endures some frost, but will not stand a severe one.

Auricula.—This is one of the flowers, the species of which are distinguished by having awarded to them the names of famous *men*, famous *women*, famous *cities*, famous *battles*, &c. It may be raised from seed; but the flowers so raised do not resemble those of the parent plant, except by mere accident. However, if a flower be produced different from any which has appeared before, there will be a chance to add to the list of names. Auriculas are best propagated by dividing the roots, which send out several young plants annually. They are tender, and, if planted in open ground they must be well covered, and be kept from severe fros and rain during the winter. They are well calculated fo pots, to flower in the parlour.

Azalea nudiflora.—Several species—commonly called American honeysuckle. This shrub blows profusely—very fragrant, and makes a fine appearance in a border.

Box—*Buxus sempervirens*—is a small, delicate shrub, which may be pruned to any shape, to please the fancy. It is an evergreen, hardy, and is proper to trim beds. It appears well in a border. It is propagated by cuttings, or by dividing the roots. If a plant be placed deep in the earth, and the soil be brought in close contact with the small branches, (being spread as much as possible,) they will send out roots, and afford a great number of small plants. The small branches are used by the ladies to trim cake, &c.

Brier, sweet—*Rosa rubiginosa*—is a well known bush of the rose family—very hardy—foliage bright and fragrant—will grow in poor ground.

Canterbury bell—*Campanula medium*—is a biennial plant, and is admired for its profusion of large blue flowers.

Carnation.—*Dianthus caryophyllus.*—Here is beauty and fragrance. It is a superb plant, and is biennial and perennial. There are various kinds, distinguished by names like those of the auricula, and what was said of the seed of that plant applies to this. It is best propagated by *layers.* While it is in flower, it sends out several side shoots near the root. These are pinned down in August a little under the earth, leaving the extreme part erect. In a little time they take root, and the new plant must be severed from the old and transplanted. The old plant does not always stand another winter; therefore, its branches are thus used to continue the species. Carnations are rather tender as to frost, and must be well covered, as far north as Massachusetts, to live through the winter. It is best to put them in large pots, and to keep them in a green-house, or parlour.

or in some place where they can have air and light, during the winter. They merit all the care that can be bestowed upon them.

Cassia Marylandica is a perennial plant, producing many small yellow flowers, suitable only to stand in a border. It is hardy, and is propagated by seed.

Catalpa—*Catalpa syringæfolia*—is a beautiful tree, much admired for its foliage and showy flowers. It is propagated by seed.

Cherry, double-flowering.—This is one of the most beautiful trees in the flower-garden or shrubbery; cultivation the same as that of the common cherry.

Chrysanthemum Indicum.—This is a superb perennial flower, much esteemed; being hardy, and affording a brilliant display of beauty, late in the autumn, when the chilling blasts of the north-west and frosts have only left us the vestiges of departed verdure. They may stand in open ground until August or September, and then be taken up and placed in pots. When the frosts appear, keep them in a sitting room until after flowering, which is a long time, and then the roots may be put in the cellar, or in open ground. They will flower in the garden, if properly covered with glass. There are many varieties, all of which are propagated by dividing the roots.

Clematis, Austrian—*Clematis integrifolia*—is a perennial plant, producing very neat flowers. Best propagated by dividing the roots.

Clethra--*Clethra alnifolia*—is a very common shrub, which produces fragrant flowers, in clusters, in the autumn.

Columbine.—*Aquilegia.*—Perennial—very common—very neat—many species.

Convolvulus.—Many species—annual.—Convolvulus major is commonly called *morning glory*. It is a vine, and a great runner—many colours. Convolvulus minor, called *beauty of the night*, because it blossoms at evening—many colours. They are much admired. The seed must be sown early in the spring.

Corchorus Japonicus.—This shrub, although cultivated as a green-house plant, will thrive in a warm, sheltered place in a garden. It produces numerous flowers of a golden yellow, in wreaths, much admired.

Crocus.—A bulbous-rooted plant—hardy—very early—various colours; as blue, white, purple, yellow, &c. Appears to advantage in small pots. Propagated by the bulbs.

Cupid's car, *or* **Monk's hood**—*Aconitum napellus*—is a beautiful, hardy perennial. It produces many neat, blue flowers, both in summer and autumn. It is propagated by dividing the roots.

DAHLIA.—This is a beautiful autumnal flowering plant, a native of Mexico. There are many varieties, single and double, and of almost every colour and shade. Dahlias will grow in almost any soil, but a poor, sandy, or gravelly soil is thought best, for the purpose of preventing them from growing too luxuriant, which would be the case if planted in a rich soil In a poor soil they produce a greater abundance of flowers. They are propagated by seed and by dividing the roots.

The seed may be sown in March, in pots, and placed in a hot-bed, or green-house. About the middle of May, or when there is no danger from frost, plant them out in the borders, or wherever they are to stand, and, as they advance in height, let them be well supported by stakes, otherwise the wind will break them down.

The roots are tuberous, resembling a sweet potato, and should be taken up in October or November, and preserved through the winter in a box filled with dry sand, placed where the frost never penetrates. Towards the end of April, or when they begin to sprout, divide the roots, and plant them where they are to stand, taking care to cover them in case of frost. Plant only those that have a bud, and be careful that it is not hurt by dividing the roots. The plants soon shoot up to considerable height, and produce a great abundance of flowers. The plants must be well supported by slender stakes. They are said to do well if planted in large pots.

DAISY—*Bellis*—is a small, delicate, perennial plant, and produces beautiful little flowers. It is hardy, and well calculated for pots, placed in the sitting room; in which case they will flower in the winter. It is propagated by offsets.

DWARF BASIL—*Ocymum minimum*—is a sweet, fragrant, annual plant, easily raised by seed. But few plants exceed this in fragrance.

EGG PLANT.—This is a singular, annual plant. The white *(Solanum melongena)* is the most unique, producing a fruit resembling a large white egg. The seed should be planted early, in a hot-bed, and after the frosts have gone past, transplant them where it is desired they should stand.

EUPATORIUM, BLUE—*Eupatorium cœlestinum*—is a perennial plant, producing many beautiful flowers, much admired. Propagated best by dividing the roots.

Euphorbia lathyris—is a biennial plant, commonly called the caper-tree. It is singular in its foliage, and bears a small fruit useful for pickling. It is rather tender, but will stand the winter very well in a common hot-bed. It is raised from seed.

Fading beauty, or morning bride—*Scabiosa atropurpurea*—is an annual plant, producing beautiful flowers; but they soon fade, continuing only an hour or two. The seed should be planted early in the spring.

Fir—*Pinus balsamea*—is not a flowering tree, but it is a beautiful evergreen, and very ornamental.

Foxglove—*Digitalis*—is a biennial and perennial plant, and produces very handsome flowers. There are several species, but the purple is the most beautiful. The seed is very small, and ought to be sown early in the spring, and very lightly covered with earth. The plant possesses high medicinal virtues.

Fringe-tree—*Chionanthes*—a beautiful American shrub, covered with white flowers in its season. It is hardy, and will grow in any soil, but flourishes best in moist ground.

Geranium.—*Pelargonium*.—This plant wants hardiness only to make it one of the finest and most valuable productions in the floral kingdom. There are many varieties. Some give us flower with little or no leaf; others possess beauty of leaf, as well as of flower; some give us no fragrance; but others give us the most delightful odours, and in great profusion. The geranium is a native of the south of Africa, and will not endure the frost. It is easily propagated by cuttings from any part of the plant, old wood or young, and placed in a pot. In a green-house, they will bloom throughout a northern winter. They are, properly, green-house plants. There is one, however, which is as hardy as an oak tree, *geranium maculatum*, producing a blue flower. It is possessed of great medicinal powers.

Garden Angelica—*Angelica archangelica*—has a bold appearance when in flower. It is suitable for a border, and very showy. It is propagated by seed. It is a perennial

Glycine, cluster-flowering—*Glycine frutescens*—is a perennial vine, and will extend on the side of a house or wall to great length. It is much admired. The flowers are variegated. Propagated by seed and from layers.

Golden coreopsis.—*Coreopsis elegans*.—This is an annual plant, and produces a profusion of splendid flowers of a brilliant yellow, with rich purple centre. It is easily raised from the seed.

GOLDEN EVERLASTING—*Xeranthemum lucidum*—is a very singular plant, and produces bright yellow flowers, which, if plucked before the seed ripens, will hold their brightness for years. It is much admired. The seed should be planted early, as the plant will flower late in the season.

HOLLYHOCK.—*Althæa.*—This is a showy plant for a shrubbery. It is hardy and perennial There are various kinds; single and double, white, red, yellow, black, and variegated.

HONEYSUCKLE.—This plant is very beautiful in its place, it climbs up houses, and over hedges: it forms arbours and bowers: it blooms in clusters. Three varieties we shall name. The *Italian* (*Lonicera Italica*) produces an abundance of flowers early in the season, diffusing a rich fragrance all around. The flowers are changeable. The *variegated* (*Lonicera caprifolium*) blooms monthly, and has a delightful fragrance. The *scarlet trumpet* (*Caprifolium sempervirens*) blooms monthly,—scarlet flowers,—and makes a beautiful appearance. They may be propagated by seed or cuttings, but best by layers.

HYACINTH.—*Hyacinthus orientalis.*—This is a bulbous-rooted plant, and, like all other plants of this class, is perennial. It is a beautiful and fragrant flower; it blooms early It will bloom in glasses filled with water in a room, but better in pots of earth. It is best propagated by offsets. While the parent root is blowing, it sends out several young ones. They should be planted at the depth of four inches. There are many varieties of this favourite flower, both single and double; the former have the most vivid colours, but the latter are generally preferred. Such was the rage in Holland for this superb flower, that, in the year 1771, four thousand dollars were refused for a single bulb.

HYDRANGEA—*Hydrangea hortensis*—is a small shrub, and produces very large flowers, which are changeable. The flowers are at first green—change gradually to rose-colour—then to green—occupying the space of about six months. It is a house-plant; will bear some frost; but must be kept during the winter in a green-house, sitting-room, or cellar, into which some light is admitted. This ornamental shrub is easily propagated by cuttings.

ICE-PLANT—*Mesembryantheum crystallinum*—is an annual plant, and has an icy appearance. It is singular. The seed should be planted in pots early in the spring.

IMPATIENS BALSAMINA.—A very fine annual plant, with great abundance of showy flowers. There are several varieties, both single and double, rose-coloured, red, purple, pure white, variegated and crimson. The flowers are elegantly formed, and the colours of many are very vivid. The plant is commonly called *balsamine.* It will bloom in July, and continue in flower until the frost appears. The seed should be sown in May.

IRIS, *or* FLEUR DE LUCE.—This is a perennial plant, perfectly hardy. There are many varieties, both large and small. From its great combination of colours, and unique appearance, it has ever had admirers. It shows to advantage in a border. It is propagated by dividing the roots.

LAGENTRŒNIA INDICA.—A flowering shrub, which endures the winter of the Middle and Southern States. In Massachusetts, it must be treated like the hydrangea, but its beauty will repay this attention.

LAUREL, BROAD-LEAVED—*Kalmia latifolia*—is an evergreen shrub, which produces flowers of great delicacy and beauty, being white, tinged with red. This ornamental shrub is occasionally found in rocky woodlands.

LABURNUM—*Cytisus laburnum*—is a tall and handsome shrub, loaded, when in bloom, with yellow flowers. It is sometimes called *goldèn chain.* It is tender, and to stand a Massachusetts winter must be planted in a warm and sheltered situation. It is raised from the seed.

LARKSPUR—*Delphinium*—is an annual plant of no fragrance, but of great variety of colours. It makes a good appearance, and is easily propagated from the seed.

LILAC.—*Syringa vulgaris.*—This is a large shrub, very hardy, and much admired when in bloom. It has large bunches of flowers, which possess considerable fragrance. The white and the purple may be easily grafted, or innoculated into each other, and when the shrub, with a handsome head, is thus managed, some branches producing purple, and others white flowers, it makes a beautiful appearance. It is propagated from suckers, of which it sends out too many, and from which it should be kept as clear as possible. The Persian lilac (*Syringa Persica*) is a neat shrub, loaded, when in bloom, with very delicate flowers. It is propagated by suckers.

LILY.—*Lilium.*—Of this plant there is a great variety; but only a few shall be named.—The white (*Lilium candidum*) grows to the height of three or four feet, and produces very large, white, fragrant flowers. The Tiger (*Lilium* *tigrinum*) grows to the height of from four to six feet, and produces many spotted flowers of a bold appearance. The *Martagon* is much like the latter, except the plant and flowers are more delicate. All these are bulbous-rooted, and are best propagated from offsets. The asphodel (*Lilium luteum*) grows to the height of two feet, and produces beautiful yellow flowers. It is propagated by seed or offsets. All the above-named lilies are well calculated to beautify a border. The lily of the valley (*Convallaria majalis*) is a small dwarf plant, that thrives best in the shade, where it produces little delicate flowers of exquisite fragrance. Propagated by offsets.

LIMB-PLANT.—This plant (*Podophyllum peltatum*) is a singular production of nature. The stem, foliage, flower, and fruit, are formed in the earth; and, after the plant has come up, there is nothing more than the extension of parts. The stems, at the height of from eight to twelve inches, branch out in two arms; at the extremity of each is a large palmated leaf. In the fork proceeds the fruit stem. The first that is seen in the spring is a delicate membraneous cap, which is soon burst open by the flower-bud, which is large, white, and round. The shoulders and arms, lying close to the stem or trunk, soon appear, and, as the plant rises, the fruit stem elongates, and the arms elevate themselves. The fruit is about the size of a large lime, green while growing, and yellow when ripe; has the flavour of a pine-apple; and, as to eating, is but little inferior to that fruit. The plant requires a moist soil in a shady situation—may be propagated by seed, but best by dividing the roots, which are creeping and jointed. The root is medicinal.

LYCHNADIA—*Phlox*—is a perennial—several varieties; as purple, white, striped, &c. The plant is hardy, and produces many delicate flowers, and is long in bloom. It is best propagated by dividing the roots.

MEZEREON—*Daphne mezereum*—is a small, beautiful shrub, blooming in the month of March, loaded with flowers of delightful fragrance. It is hardy as a shrub oak, and is propagated from the seed. It produces a red fruit, which is poisonous.

MOUNTAIN ASH—*Sorbus aucuparia*—is a very ornamental tree, admired for the beauty of its foliage, and its clusters of scarlet fruit, which remain on it for months. It is propagated from the seed.

MUSK GERANIUM—*Geranium moschatum*—is an annual plant, and is admired only for its strong flavour of musk.

The plant will stand the winter in a common hot-bed, and in this case may be considered biennial. The seed must be planted early.

MYRTLE, EVERGREEN—*Vinca minor*—is an evergreen vine, producing blue flowers. There are several species, and all neat and pretty in their place.

NARCISSUS—a bulbous-rooted plant, managed precisely like the hyacinth. It blooms early, is very beautiful, and is fragrant. This plant is hardy, and well calculated to bloom in a pot, in the green-house, or in a parlour. It is propagated by bulbous offsets, which increase every year. Polyanthos Narcissus and jonquils, both elegant flowering plants, are propagated and cultivated, in all respects, in the same manner.

NASTURTIUM—an annual plant, with showy flowers. The seeds are enveloped in fleshy pods, which, before they become ripe, are excellent for pickling. The seed should be sown very early in the spring. The plants should be supported from the ground by bushy sticks.

PASSION-FLOWER—*Passiflora*—is a perennial vine, which produces a very beautiful flower. The name originated from the large *cross* in the middle of the flower, surrounded by appendages resembling a *glory*. The plant is also beautiful; and, like the honeysuckle, has a succession of flowers for a long time. It is tender, and suitable for the green-house. It will not endure a northern winter in open ground. It is best raised from cuttings.

PÆONY—*Pæonia*—is a perennial, that has a very grand flower, but of short duration. There are several species much admired. Propagated from offsets.

PEA, SWEET.—*Lathyrus odoratus.*—There are many species as to colour and fragrance. These are annual. The everlasting pea (*Lathyrus latifolius*) is perennial, and produces many clusters of showy flowers, and remains in bloom a long time. The seed should be planted early in the spring.

PEACH, DOUBLE-FLOWERING.—This is a very showy tree; its flowers are as double and as large as the smaller sorts of roses—hardy, and treated like other peach-trees.

PINK—*Dianthus*—is a perennial plant, too well known to be described here. There are many kinds, as to size and colour, but all are fragrant. They are desirable articles for a flower-garden, and are easily propagated by seed, by layers, and by dividing the roots.

PERENNIAL SUNFLOWER, DOUBLE—*Helianthus multiflorus*

—is a fine plant to beautify a border—propagated by seed, r by dividing the roots.

Polyanthos.—This perennial plant (*Primula polyanthos*) is hardy, has many showy flowers, and is much esteemed. There are many varieties. The plant blooms best in a shady situation. It is best propagated by dividing the roots. Polyanthos Narcissus is a very pretty perennial, well calculated to bloom in a parlour. It is bulbous-rooted, and easily propagated by offsets.

Pyrethrum Parthenium, commonly called double feverfew, is a hardy perennial, and produces an abundance of white flowers, and continues in bloom a long time. It is easily propagated by the seed.

Poppy—*Papaver*—is an annual plant, admired for its great variety in size and in flower. The double are very showy, but, like beauty, soon fade. It is a medicinal plant, and easily cultivated.

Purple hyacinth bean—*Dolichos*—is an annual runner, producing large clusters of purple flowers, much admired. The seed should be planted early, and the plants defended from the frost.

Rose.—*Rosa.*—This favourite flower is worthy of all the care and attention that can be paid to it. There are many varieties, as to size, singularity, foliage, beauty, and fragrance. Some catalogues enumerate more than five hundred varieties. Messrs. G. Thorburn & Son have a splendid collection in their green-house, Liberty Street, New York. No class of plants yields more intrinsic delights than this. It is unrivalled. To describe the beauties and excellence of the various species would fill a volume.

They may be propagated from seed, but, as the seed seldom comes up till the second year, the usual mode of propagation is by suckers, which come out near the old stems, during the summer. The suckers, when planted out, should be cut down to four or five inches of the ground. The time for planting is either in the months of October and November, or in April. As to the management, the ground should be kept good, and dug every autumn. They should, except when trained against a wall, be kept cut down to a certain height, according to their natural size; for when they get long stems and limbs, they produce fewer flowers. All the weak, dead or dying wood should be pruned out close, without leaving any ugly stubs. "The yellow rose requires an airy situation and a gravelly soil, and that, every autumn, one half of the old wood should be cut down within four inches of the ground; by this means a succession of thrifty, blooming shoots will be kept up.

The Chinese monthly roses are propagated by cuttings, taken in the spring, and properly placed in moist earth. These are generally tender, and require to be taken into a green-house or parlour during the winter. There are some, however, that are very hardy, and bid defiance to the frost. The writer of this article has a Chinese pale-red, monthly rose, which has stood out for several years, being only covered with a box, during the severity of the winter. It is now February 28, 1828, and the foliage is yet bright, although it has been frozen many times, during the present winter. The thermometer, however, has not been lower, the present season, than one degree above zero."

Rose acacia—*Robinia hispida*—is a singular shrub, producing many clusters of flowers, much admired. Propagated by shoots from the roots.

Rose-coloured hibiscus—*Hibiscus palustris*—is a perennial plant, producing very showy flowers—makes a good appearance in a border. Easily propagated from the seed.

Rudbeckia—a perennial plant, producing many flowers, which are very durable and much admired. Propagated best by dividing the roots.

Scarlet cacalia—*Cacalia coccinea*—is a small annual plant, which produces numerous scarlet flowers, very showy. Easily raised from the seed.

Scarlet lychnis—*Lychnis chalcedonica*—is a perennial plant. There are two varieties, the single and the double. The single is pretty, but the double is splendid. The former is propagated from seed, and the latter by dividing the roots.

Siberian crab.—This is a small tree, esteemed for its large, fragrant flowers, and for its small fruit. The *Pyrus prunifolia* produces a beautiful longish fruit. The *Pyrus baccata*, or cherry crab, bears a beautiful round fruit. The *Pyrus spectabilis*, or Chinese double blossom, has the most beautiful flowers of the family. They are all delicate in form and flower.

Snow-ball tree—*Virburnum opulus*—is a beautiful shrub, especially when in bloom. It is propagated by suckers.

Snowberry—*Symphoria racemosa*—is a small shrub, which produces clusters of white fruit in autumn, and is ornamental. Propagated best by suckers.

Spice-wood—*Laurus benzoin*—is a very fragrant shrub, of medicinal virtues. It grows best in the shade, and sometimes bears a long, green, spicy fruit. It is propagated by suckers.

Spiderwort—*Tradescantia*—is a singular perennial plant, which is in bloom for a long time. The blue is more admired than the white. It requires a light covering during the severity of winter; and is propagated by dividing the roots.

Spiræa.—This is a small shrub, loaded with delicate flowers in the season of its blooming. Propagated by suckers.

Syringa, *or* **Mock orange.**—A shrub, which has flowers much like those of the orange. It makes a pretty appearance with other shrubbery. Propagated by suckers.

Strawberry tree—*Euonymus*—is a very handsome shrub, producing, in autumn, an abundance of fruit, somewhat resembling the strawberry. The European is preferred to the American. It has been called the *burning bush*, from its appearance when loaded with ripe fruit. It is propagated by seed and by suckers.

Sweet bay—*Laurus nobilis*—is a very pretty evergreen shrub, well calculated to stand (in a large pot) in the parlour during winter. Propagated by suckers.

Sweet William, *or* **Poetic pink**—*Dianthus barbatus*—is an imperfect perennial, producing very handsome flowers of small size. It is propagated by seed, the plants of which do not produce flowers like those of the parent plant, except by chance. It may be propagated by dividing the roots.

Tulip.—*Tulipa.*—In no family of plants has Nature so varied her delicate tints as in this. There are more than six hundred varieties of this splendid flower cultivated in the Linnæan Garden on Long Island. During the tulip fever, which raged in Holland, about the middle of the seventeenth century, some splendid varieties were sold for enormous sums of money; one of which, called the *viceroi*, brought ten thousand dollars.

The tulip may be raised from seed; but it is, as in the case of the auricula, mere chance if one be obtained, that will produce flowers like those of the parent plant. They are best propagated by the bulbs.

There is something respecting this plant astonishing, After flowering, the foliage and roots decay, and a bulb or bulbs are formed of the juices of the old plant. A bulb contains all the parts of the future plant, and soon becomes as much disengaged from the decayed parent plant, as the ripe acorn is disengaged from its parent tree. At this time, they may be carried (like many other bulbs) any length of distance in dry moss or dry sand. They should be planted out, about three inches below the surface, in a rich soil, in August or September; after which they throw out roots, and prepare for an early appearance in the ensuing spring. If the bulbs be kept through the winter, and planted in the spring, they do not thrive that season. The nice varieties should be taken up after the decay of the old plants, every year, air-dried, and kept until September or October, and then planted.

VENITIAN SUMACH, *or* FRINGE TREE—*Rhus cotinus*—is a very singular and beautiful tree, which is loaded "during summer with tufts of russet-coloured down, and forms the most singular ornament of the garden." It has been called the *smoke tree.* Propagated by layers and by suckers.

VIOLET, BLUE, FRAGRANT.—This little plant (*Viola odorata*) is perennial; the flowers blue, double and fragrant. It blooms early in the season, and continues in flower for some time. "It is of considerable use in chymical inquiries, to detect an acid or an alkali; the former changing the blue colour to a red, and the latter to a green." It is best propagated by dividing the roots, which spread very much.

FRUITS.—The following was written for this work, at the request of the compiler, by a distinguished member of the Massachusetts Agricultural Society:—

Under the titles of each species of fruits, we have treated of their culture, and general character: this article will be devoted, exclusively, to the selection of the most approved sorts of each species of fruits. Nothing can be more annoying, nothing more embarrassing to those, who are desirous of making valuable collections of fruit-trees, without any previous personal experience, than the interminable lists, and the indiscriminate praise bestowed by nursery men. We blame them not—it is their business and their profit—the greater the variety of new names, the greater the sale. Yet it is true, that of the 150 varieties of apples, and the equally great number of pears—of the vast collections of peaches and cherries, there are but a few which are of superior quality, and these few, judiciously selected. will amply suffice for all the wants of private families. For the market-gardener in the vicinity of great cities, a more ample list may be of great use and profit. So, also, the amateur of great fortune may be desirous, as a matter of curiosity, of having in his possession every known variety. Yet he will acknowledge, after all, that, if he cannot sell them, seven eighths of the whole number will perish, because better fruits are in eating at the same time. How few apples and pears can be disposed of by a private family during the period when the peaches are in perfection! The famous Duhamel, the greatest cultivator and writer on fruit-trees in any country or age, after devoting two quarto volumes in describing all the fruits of France known in his day, terminates by giving a list of forty or fifty sorts which would suffice for the luxury of any private man. It is our purpose to make a selection, we will not say of the *best*,—for as the tastes of men differ, it would be arrogant to say this,—but of what we esteem the best, and which are most generally esteemed, adding something of the qualities of each. We shall introduce them in the order of ripening.

APPLES.—*Juneting* or *Jenneting.*—This is the earliest apple of our country, and is very pleasant and valuable for its quality of early ripening. It is fit for apple-sauce on the 20th of June, and for eating early in July.

Early summer pearmain.—This is said to be one of the finest summer apples; is of a reddish colour, fit for the table and for cooking; it has the desirable quality of flourishing in light and sandy soils; ripens the first of August.

The *codling.*—This is a favourite apple in England for pies and stewing; is fit for this use in August, and lasts till October.

Siberian crab.—This apple is remarkable for its beauty. It makes a beautiful preserve, to be used in winter. One small tree will suffice for a family. It is ripe in August, and should be preserved before it becomes mealy.

Monstrous pippin.—This is an enormous apple, of transient duration, but of good flavour. One tree would suffice It is a small bearer, but as a cooking apple it is valuable, ripens in October.

Pomme d'api, or *lady apple.*—This is a beautiful little apple; a constant bearer; an ornament to the dessert, from November to April. It is pleasant to the taste, but its principal value is its ornament to the table. One tree will suffice.

Doctor apple.—It is a large and handsome fruit, highly esteemed; ripens in October, and keeps for some months.

Bell-flower.—This apple we can decidedly recommend, from twenty years' trial. It is a great bearer—beautiful bright yellow: it is fit for cooking and for the table; ripens in November, and will keep till March. Its skin is so tender, that it must be gathered with great care, and put up with equal tenderness. It is the most popular apple in Philadelphia, and would be so here, if its merits, and its careful management in putting it up, were generally known It is a vigorous and healthy tree.

Ribstone pippin.—This is a celebrated English apple, of fine flavour, and some beauty. It will keep from November to February. It has the pippin texture, is rather a shy bearer, and ought not to be cultivated extensively: but one or two trees would reward the cultivator.

The two *Spitzenbergs*—the *Newton* and *Esopus.*—These are American fruits, of the very finest quality, keeping sound, and retaining their flavour till May, from December. They bear *every year*, though, like all others of this class, they have their full and their scanty years of bearing. It is however admitted, that they are declining, not in goodness, but in fertility. On new lands they may do well for fifty years more.

The *Baldwin apple*, formerly called the *Pecker apple.*—This is probably a Massachusetts production, originating in the county of Middlesex. It is now in its prime; a healthy tree; an enormous bearer; bearing every other year, and in the intermediate one not producing an apple; for beauty, richness, and other fine qualities, not yielding to any apple in the world, except the American apple called the Newtown pippin. It is in eating from December to the first of April.

The *Newtown pippin.*—This is a New Jersey production; the finest apple in our country. It flourishes with us, but its fruit is not so fine as those grown in New Jersey. In some situations it however succeeds almost as well as in New Jersey, and is well worthy of a place in every garden, as its fruit will keep till May.

The *Roxbury russeting.*—This is a standard natural fruit of Massachusetts. Every other year it is a great bearer. Its fruit is pleasant for the table from January to July, if kept in a cold place. We add nothing further in favour of the Roxbury russeting, because its great merits for our climate are well known. We can find no reason to believe that it was ever known in any other country.

Rhode Island greening.—This, too, seems to be a Yankee production, and a most valuable tree it is. It bears in alternate years. It is too great a bearer. The tree is inclined to bend down, and bear low. This fault should be corrected. It is principally valuable as a cooking apple, in which respect it is superior to any other. For the table it is good only when better fruit cannot be had.

Gardner's sweeting.—This is the most valuable of all the apples for baking. It bears in alternate years. It will keep till April, but it is prone to rot.

There are a great variety of sweet apples for summer and winter use, and many fine varieties of winter apples, which we have omitted. Every one knows the *nonesuch*, and the *pearmain*, superior to almost any in our list, but both appear to us to be on the decline, though we recommend their culture, on a small scale, to all who have extent of ground · our object being simply to select for small cultivators the most approved varieties. Coxe, of New Jersey, the earliest and most extensive cultivator on a great scale, has recommended the following selection of apples; and in his judgment we place great reliance :—

Juneting, ripens in	June and July.	Wine, ripens in	November.
Prince's harvest,	July.	Late pearmain,	do.
Bough apple,	do.	Bell-flower.	
Early pearmain,	August.	Newark pippin.	
Summer rose,	do.	Pennock.	
Codling,	September.	Michael Henry,	November.
Maiden's blush,	do.	Spitzenberg.	
Hagloe's crab,	do.	Newtown pippin.	
Catline,	do.	Priestley.	
Rambo,	October.	Pomme d'api.	
Fall pippin,	do.	Car-house.	
Doctor apple,	do.		

We think our own selection preferable for these Northern States.

PEARS.—*Petit Muscat.*—To those who wish to have the earliest possible ripe pear, this insignificant but premature pear may be desirable.

Rouselet hatif.—This pear is beautiful, and highly flavoured, and one small tree is all that any cultivator would desire. We know it by the name of Catherine, or, as it is pronounced, *Kattern.*

Madeleine, or *green chissell.*—This is a fine summer pear.

Skinless pear, or *blanquette à longue queue*, is a delicious, but short-lived pear.

Epargne is a pleasant pear.

Red bergamot is a beautiful pear of the flavour of the bergamots.

The *real Jargonelle* is one of the finest summer pears. It is a great and constant bearer, and comes in between the smaller fruits of the garden, the strawberry and raspberry, and the peach. As seen in Boston market, it is a caricature of the fruit raised by the cultivator for his own use. It is gathered unripe, and artificially ripened by being put up in great masses.

The *summer good Christian* is a luscious and juicy pear but it is scarcely possible to raise it in the country, being subject to spots and cracks.

Salviati, ripening early in August, is a delicious pear in good soils: in poor land it is of no value.

Broca's bergamot is one of the finest pears grown in sheltered situations; but in exposed ones, its leaves fall, and its fruit is acid.

The *grey beurré*, the prince of pears in Boston, and in the sheltered gardens of France, is of no value in the country, unless on walls, or in gardens sheltered by walls or hills.

Seckle pear.—This is the greatest acquisition yet made to the list of pears for New England culture. It is hardy, bears every year, is subject to no casualty, and its flavour, to most persons, is the finest of any pear yet known. It lasts about six weeks, from Sept. 15th to Nov. 1st. It is supposed to be a native. No man should be without three or four of them.

Moor-fowl egg.—This pear ripens in November; is delicious, though of a peculiar flavour.

There is a variety of this pear, which is striped, in the garden of John C. Gray, Esq., at Cambridge.

The *St. Michael's pear*, by the French called *Doyenné*.—This pear was, till lately, the pride of our gardens. Beautiful beyond any other pear, melting, and extremely sweet, it bore the palm of all autumnal pears. Causes unknown have, for ten successive years, blighted its fruit; yet we advise the continued culture of it, because we have seen the peach, after fifteen years of failure, resume its wonted fertility and vigour.

Messire Jean.—This is an admirable pear; hardy, prolific, of a breaking texture, extremely sweet, and ripening in November and December. It seems to us to be rather on the decline, but, in new gardens, it may revive.

The *Amory*, or *Gibson*, or *Andrews pear*.—These various names are only given because we are ignorant of the real name. It is a European pear, unquestionably, and the new names are only given to the same tree, because the *same identical tree* has had, in the *same* garden, three successive owners.

It is a very fine, but transient pear, of beautiful form, and excellent qualities, ripening in September, which lessens its value.

The *Bergamotte Cressanne.*—This pear, in perfection, though rather austere, has all the high flavour of the *bergamot* family; but it is more apt to crack than any other pear whatever. The writer of this article, after twenty years' trial, has been compelled to regraft them all. It will not suit the country, unless sheltered.

The *Virgalouse.*—This, one of the finest pears of France, is subject to the same evil as the foregoing, and we solemnly warn the cultivators in the country not to try it unless they have terraces or walls.

The *Colmar.*—The same remarks will apply to this pear also. We speak from long experience, and from the experience of other eminent cultivators. We must not listen to French or American writers. This pear is not suited, with us, but to the city, or to the opulent cultivators, who make an artificial shelter for their trees either by walls, or buildings, or terraces.

The *St. Germain.*—This most noble variety of the pear family succeeded as well in the country as in town during the first twenty years of our knowledge of it, but it has failed during nearly fifteen years. It has seemed to be recovering, and we should advise the continued culture of it for a few years longer, as it is superior to any pear except the following.

The *Ambrette.*—This pear was introduced into this state in 1812. Mr. Coxe, who sent it here, called it the *Ambrette.* It is an ordinary pear in its appearance; a strong, vigorous, great-bearing tree. Not knowing its character, it was first eaten as soon as it was soft; but accident obliging us to keep it longer, it proved to be one of the best winter pears grown in our climate. It has high praise in France. Its merit with us, however, is, that it bears our climate perfectly. One small tree, imported in 1812, bore five barrels of fruit in 1816.

Of the baking pears there are many varieties:—

The *pound pear* is a great bearer, and makes a valuable baking and stewing pear.

The *iron pear*, so called in this vicinity, is nearly as valuable, as the fruit is now sound in the month of April.

The *Catillac* is also valuable from the same qualities, and is much more beautiful.

The *Spanish good Christian* is also a great bearer, and fitted for the same purposes.

We may now add the valuable varieties of pears sent to this country by Mr. Knight, with many more introduced by that indefatigable and most successful cultivator of fruits in New England, Samuel G. Perkins, Esq. of Brookline, to whom our northern horticulture is deeply indebted for his liberal dissemination of his new and valuable varieties.

Mr. Knight's trees are all of them *entirely new*, not, as has been supposed, *produced* by him, but principally by Mr. Van Mons, of the Netherlands. The new kinds, thus introduced, are as follows:—

Cassiomont.—This pear has borne fruit. It ripens in September—is of a fair size, beautiful to the eye, and delicious to the taste; well adapted to supply the place of the *St. Michael's*, should it fail us.

Napoleon, said to ripen in October, is described as a fine fruit—has not borne in this country.

Marie Louise is equally recommended—ripening in October—is showing abundance of fruit the present year.

Buerre Knox showed its fruit in 1826—a beautiful and large pear, of buttery texture, ripening in October—is also in fruit this year.

Tillington—praised as a beautiful fruit—not in bearing.

Passe Colmar—a late fruit—not in bearing.

Colmar d'hyver—a late fruit—not in bearing.

Harden pont de Printems—showing fruit this year, and presumed to be the best fruit of the pear kind for our climate—ripening in April and May.

Poire d'Aremberg—also represented as an excellent pear. Mr. Perkins has also received many other new varieties, among which we recollect the *Charles d'Autriche* and the *Sylvanche.*

The only object in introducing into this list these new varieties, is to say, that though we have distributed several thousand scions and buds, and although we have been robbed of many more, yet we have so many flourishing shoots, that we shall be able to furnish as many buds the ensuing season, and grafts the season following, as we have ever been able to do, having kept the trees in a bush state, to encourage the growth of shoots for cultivation.

PEACHES.—This class of fruits is so natural to our country, that a great variety, unknown to European cultivators, are found, of very considerable merit. We shall therefore take notice of the varieties only more particularly distinguished.

The two varieties of nutmeg peaches have no merit whatever, except their great precocity. The earliest peach of any value is the *early Anne*, a white and very tolerable peach.

The white Magdalen,
The royal Kensington,
The alberge,
The swalsh,
The noblesse,
The red Magdalen,
The admirable,
The old Newington,
The teton de Venus,
Jaques' rareripe.

These we can recommend as excellent fruits. There are many others of excellent quality, both foreign and native; but these will suffice for a moderate-sized garden.

There are a great variety of native peaches, the value of which is often as great as that of any peaches which have names, particularly of those which have a yellow flesh. The yellow-fleshed peaches are more apt to propagate their like from the stone than any other peaches.

The *nectarine.*—Though this fruit is nothing but a smooth peach, yet it is far more tender, and requires either a wall, or a fence, or the side of some building, to protect it. The varieties are not numerous. The best are,

The Elruge; ripens in August.
The white; a beautiful fruit;—September.
Lewis's nectarine, a Boston production; beautiful; yellow-fleshed; ripens in September.
Late Newington; rich and melting; September.
Red Roman; a beautiful and highly flavoured variety.

There are seven or eight others, but these we recommend.

The *apricot.*—This requires some shelter also; should be planted in a yard, or on the south side of a building; if nailed to it as an espalier, the better. The best are,

The Breda,
The Brussels,
The Moor park,
The peach apricot.

CHERRY.—The varieties are innumerable. For small gardens we recommend

The May duke, for its earliness,
The common white-heart;
The bigarou, or late white-heart,
The early and the late black-heart,
The black Tartarean,
The red mazard new variety, called the Downer cherry.

Mr Knight's new sorts are not yet tested here.

For pies and puddings, as well as for [illegible], every garden should have a Morello, which is very juicy, though very acid.

Plum.—The best plum known is the green gage, which the French call Reine Claude. Others of esteemed value are the

Violet,
Orleans,
Fotheringham,
Drop d'or,
Coe's golden drop,
Red imperial,
White imperial,
La royale.

Berries.—The English garden *mulberry* is a highly esteemed fruit, but it is apt to be winter-killed in our climate, unless in sheltered spots.

Gooseberry.—This is a fine fruit, as brought to perfection in Great Britain. The varieties are almost infinite. The gardeners have given names to several hundred. The only direction should be to send the best Lancashire or Scotch gooseberries, of various colours. They are white, green, yellow, red, and dark purple. Some of the smaller sorts are better flavoured than any of the larger kinds.

Currant.—There are but three sorts worth cultivation—the large Dutch white; the large Dutch red; and the Champaigne, or pink-coloured, as a variety.

Raspberry.—There are only two sorts of any great value—the white Antwerp, and the red Antwerp. The cane, or smooth-stalked, is also praised by some persons, but we have had no success with it; it seems to us to be our native raspberry.

Strawberry.—For the chief crop, the red and white Alpine are the most prolific: for show and flavour, the pine-apple, the roseberry, the scarlet or Virginia, and Knight's Downton, seem to us to include all that need be desired. Mr. Parmentier, of Long Island, has introduced a sort without runners, which are said to bear twice. We have not seen them, though they are growing here.

GARLICK.—*Allium sativum.*—Garlic is a hardy, perennial plant, with a bulbous root, which grows naturally in Sicily and the south of France. The leaves are linear, long and narrow. The bulb is composed of a dozen or fifteen subordinate bulbs, called cloves.

Culture.—Garlic is propagated by planting the cloves, or subdivisions of the bulbs, and prefers a "light, dry soil, rich, but not recently dunged. In February, March, or beginning of April, having some large, full bulbs, divide them into separate cloves, and plant them singly in beds, in rows lengthwise. Set them from six to nine inches asunder, two or three inches deep, either in drills or in holes made with a blunt-ended dibble. In placing the cloves in drills, thrust the bottom a little into the ground, and earth them over the proper depth."—*Loudon.*

M'Mahon says, garlic, rocambole and shallots, may be planted in October or November, and observes, that, "when planted at this season in dry, light, rich ground, the roots will be much larger than if deferred till spring."

Taking the crop.—"The maturity of the bulbs is discoverable by the leaves changing yellowish, in a decaying state; when they may be taken wholly up. Continue the stalky part of the leaves to each root; spread them in the sun to dry and harden, and then lie them in bunches by the stalks, and house them, to keep for use as wanted: they will remain good till the next spring and summer. If, in their advancing growth, some are required for present use, before attaining maturity, a few of the early planting may be drawn in May or June; but permitting the general supply to attain full growth as above."—*Abercrombie.*

Use.—It is used by many nations very extensively in cookery, both for seasoning and for food; but not so much by the English or Americans for that purpose. "The medical properties of garlic are various. In dropsical complaints, asthmas, and agues, it is said to have been successfully used. Some instances have occurred, in deafness, of the beneficial effects of wrapping a clove of garlic in muslin, and putting it into the ear. As a medicine internally taken, it is usually administered as a bolus, or made into pills. Its smell is considered as an infallible remedy against vapours, and as useful in nearly all the nervous disorders to which females are subject. An oil is sometimes prepared from garlic, which is so heavy as to sink in water; but the virtues of this pungent vegetable are more perfectly and more readily extracted by spirit of wine than in any other way. A syrup also is made of it.

"The juice of garlic is said to be the best and strongest cement that can be adopted for broken glass and china, leaving little or no mark if used with care. Snails, worms, and the grubs or larvæ of insects, as well as moles and other vermin, may all be driven away by placing preparations of garlic in or near their haunts."—*Dom. Encyc.*

GOOSEBERRY.—*Ribes grossularia.*—The gooseberry is a native of several parts of Europe, and is cultivated to great perfection in Lancashire, in England. Loudon says, "Happily, this wholesome and useful fruit is to be found in almost every cottage garden in Britain, and it ought to be considered a part of every gardener's duty to encourage the introduction of its most useful varieties in these humble enclosures. In Lancashire and some of the adjoining counties, almost every cottager, who has a garden, cultivates the gooseberry with a view to prizes, given at what are called gooseberry prize meetings; of these there is annually published an account, with the names and weight of the successful sorts, in what is called the *Manchester Gooseberry-Book*. The prizes vary from 10*s.* to £5 or £10; the second, third, to the sixth and tenth degrees of merit, receiving often proportionate prizes. There are meetings held in the spring to 'make up,' as the term is, the sorts, the persons, and the conditions of the exhibition; and in August, to weigh and taste the fruit, and determine the prizes."

Varieties.—Loudon says, "The present lists of the London nursery-men contain from eighty to one hundred names; but those of some of the Lancashire growers above three hundred. Forsyth, in 1800, mentions ten sorts as common; and adds a list of forty-three new sorts grown in Manchester."

Propagation.—The gooseberry may be propagated by all the modes applicable to trees, or shrubs; even by pieces of the roots; but the mode by cuttings is usually adopted for continuing varieties, and that by seeds for procuring them.

By seeds.—So far as we know, the scientific mode of impregnating one variety with another has not been applied to this fruit. In general, the seed of some choice variety, thoroughly ripe, is taken, and sown in autumn, or early in the spring, in beds or pots of rich, light, mellow earth: when the plants are a year old, they are planted out in nursery rows, to be cultivated and trained there a year or two: in general, they will bear the third year.

By cuttings.—The best season for planting gooseberry cuttings is in autumn, just before the leaves begin to fall: early in the spring, as soon as the ground is sufficiently thawed, however, will answer nearly as well. The cuttings should be taken from the bearing shoots. Cut them to such a length as the strength and ripeness of the wood will bear, and cut off all the buds except three, or at most four, at top, and train the plants with a single stem of nine inches or a foot high, from the top of which the branches should radiate upwards at an angle of 40°, or better if 45°

Haynes, an English writer, advises taking off cuttings in July, when the fruit is on the tree, in order to make sure of the sorts; and says, by immediate planting, watering and shading, as good plants are produced as from ripe wood cuttings.

"*Soil and site.*—Any good garden-soil, on a dry bottom, and well manured, will suit the gooseberry. That which is soft and moist produces the largest fruit. The situation should not be under the drip of trees over-much shaded or confined, otherwise the fruit will be small, ill-flavoured, and the plants apt to mildew. Forsyth says, gooseberries should be dunged every year, or at least have a good coat of dung once in two years. Haynes recommends a mixture of peat and loam well manured, and a shaded situation. The last he proposes to effect by planting, among his compartments of gooseberries, rows of Jerusalem artichokes in the direction of east and west."—*Loudon.*

Final planting.—"The season for planting gooseberries is any time during open weather, from October till March [or the 1st of April in New England]. When trees are procured from the public nurseries, choose such as are of some advanced size, about three years' growth, with pretty full heads, for immediate plentiful bearers. Let the general supply be in standard bushes, and planted principally in the kitchen-garden, in single rows, along the boundary edges of the main compartments. When the object is to raise large quantities of fruit, plantations are made in continued parallel rows, eight or ten feet asunder, by six feet in the row. It would be eligible to plant a few sorts against south and other sunny walls, or paling, for earlier and larger fruit; and on north walls to ripen late in succession."—*Abercrombie.*

Forsyth says, "The market-gardeners about London plant them in rows, from eight to ten feet apart from row to row, and six feet from plant to plant, in the rows. In small gardens I would recommend planting them in a compartment by themselves, at the distance of six feet between the rows, and four feet from plant to plant; or you may plant them round the edges of the compartments, about three feet from the path; you will then have the ground clear for cropping, and a man, by setting one foot on the border, can gather the gooseberries without injuring the crop."

Neill says, "In some places, gooseberry-trees, on the sides of the borders, are trained to a single tall stem, which is tied to a stake; this, though six or eight feet high, occasions scarcely any shade on the border, and it does not occupy much room, nor exclude air; while, at the same time, the stem becomes hung close with berries, and makes a pleasant appearance in that state."—*Edin. Encyc.* art. *Horticulture.*

Mode of bearing.—"The gooseberry produces its fruit not only on the shoots of last summer, and on shoots two or three years old, but also on spurs or snags arising from the elder branches along the sides; but the former afford the largest fruit. The shoots retained for bearers should, therefore, be retained at full length, or nearly so."—*Abercrombie.*

Pruning.—"The bushes will require a regular pruning twice in the year."

Summer pruning.—"Where any bushes are crowded with cross and water shoots of the same year, shading the fruit from the sun, and preventing the access of air, thin the heart of the plant and other tufted parts moderately, pinching off or cutting out close what spray is removed; but do not touch the summer shoots in general." Maher says, "It will greatly contribute to the perfection of the fruit, if the very small berries are taken away with a pair of scissors, about the middle or end of May; and these small berries will be found quite as good for sauce, or gooseberry-cream. as the larger."

Winter pruning.—"You may proceed to the winter pruning any time from November until the end of February, or until the buds are so swelled that further delay would endanger their being rubbed off in the operation. Cut out the cross-shoots and water-shoots of the preceding summer, and the superfluous among crowded branches. Prune long ramblers and low stragglers to some well placed lateral or eye; or, if an under-straggler spring very low, cut it away. Of last year's shoots retain a sufficient quantity of laterals and terminals, in vacant parts, to form successional bearers, and to supply the places of unfruitful and decayed old wood, which, as you proceed, should be removed. Mostly retain a leading shoot at the end of a principal branch, leaving it either naturally terminal, or, where the branch would thus be too extended, pruning to some competent lateral within bounds. The superfluous young laterals on the good main branches, instead of being taken off clean, may be cut into little stubs of one or two eyes; which will send out fruit-buds and spurs. Of the supply reserved for new bearers, a small number will probably require shorten ing, where too extended, or curvated incommodiously: leave these from eight to twelve inches in length, according to strength and situation; those of moderate extent and regular growth will require very little shortening, and many none at all. Observe, too close cutting, or general shortening, occasions a great superfluity of wood in summer; for the multiplied laterals, thus forced from the eyes of the shortened branches, increase to a thicket, so as to retard the growth, and prevent the full ripening of the fruit: on which account it is an important part of pruning to keep the middle of the head open and clear, and to let the occasional shortening of the shoots be sparing and moderate. Between the bearing branches keep a regulated distance of at least six inches at the extremities, which will render them fertile bearers of good fruit. Some persons, not pruning the gooseberry-tree on right principles, are apt to leave the shoots excessively close and tufted, while they shorten the whole promiscuously; others sometimes clip them with garden shears to close, round heads: in consequence of being pruned in these methods, the bushes shoot crowdedly, full of young wood in summer, from which the fruit is always very small, and does not ripen freely with full flavour."—*Loudon.*

Forsyth says, "Many of the Lancashire sorts are apt to grow horizontally, and the branches frequently trail on the ground, which renders them liable to be broken by high winds, especially when they are loaded with fruit. In that case, I would recommend two or three hoops to be put round them, to which the branches may be tied, to support them, and prevent their being broken by the wind."

Prolonging the crop.—"In addition to planting late sorts in shady situations, the bushes, whether standards or trained, may be matted over when the fruit is ripe, and, in this way, some of the reds, as the Warrington, and the thick-skinned yellow sorts, as the Mogul, will keep on the trees till Christmas."

Insects.—The gooseberry is infested with the caterpillars of several species of flies, and various methods have been prescribed to destroy them, which are detailed by Loudon. —*Encyc. of Gard.* p. 734, 735. The applications he mentions were, generally, made by means of watering-pans and garden-engines, and the substances used were decoctions of tobacco, elder leaves, black currant leaves, soap, quick lime, &c. Mr. Loudon observes, however, that, in his opinion, "the only effectual plan seems to be that of hand-picking, which, however tedious it may seem, will often be found a more economical mode than any of the above. Hand-picking, with the spring-generated kinds, should commence as soon as the eggs are observed on the undersides of the leaves, of a white colour, and not thicker than hairs: the whole leaf may be picked off, or the eggs brushed or sponged off: with the winter kinds, it ought to commence as soon as they leave their nidus in the soil or bark, and appear on the leaves."

Preventive treatment.—"Sprinkling gooseberry and currant bushes with tar-water prevents the fly or moth from settling on the plant to lay its eggs; this must bedone early in the spring, for, if done after the fruit is set, it will taste of tar."—*J. Busch*, in *Hort. Trans.* iv. 415.

Forcing.—"The gooseberry may be forced in pots or boxes, placed in pits, or in the peach-house or vinery. Hay plants in pots in November, removes to the peach-house in January, and has ripe fruit in the end of April, which he sends to the table growing on the plants."—*Hort. Trans.* iv. 415.

Use.—"The fruit was formerly in little esteem, but it has received so much improvement, that it is now considered very valuable for tarts, pies, sauces, and creams, before being ripe, and, when at maturity, it forms a rich dessert fruit for three months, and is preserved in sugar for the same purpose, and in water for the kitchen. Unripe gooseberries can be preserved in bottles of water against winter; the bottles are filled with berries close-corked and well-sealed; they are then placed in a cool cellar till wanted. By plunging the bottles, after being corked, into boiling water for a few minutes, (heating them gradually to prevent cracking,) the bottles are said to keep better."—*Neill.*

Gooseberry wine is made in the same manner as currant wine, except that one third less sugar is required. In picking the berries, take none that have fallen upon the ground, or that have been shaded and grown sour.

GOURD.—*Cucurbita.*—There are various kinds of gourds, which are, in this country, cultivated rather for ornament than use. They may be sown at the same time, and cultivated in the same manner, as melons and cucumbers; but should be trained to trellises, fences, walls, or to cover arbours. "The large bottle-gourds (*cucurbita lagenaria*) are from ten to fifteen inches in length, and the shells will hold from one to three quarts. They are light, and make good dippers, and, with good usage, will last years. If, after a few gourds have set, the ends of the vines are pinched off, the fruit will be larger and better. The bicoloured gourd (*cucurbita bicolor*) is a small, beautiful, round fruit, one part a deep green, and the other a bright yellow. Only ornamental."—*Dr. Green.*

GRAFTING is the taking a shoot from one tree, and inserting it into another, in such a manner that both may unite closely, and become one tree. Its use is to propagate any curious sorts of fruits, so as to be sure of the kinds, which cannot be done by any other method.

The grafts or scions should be cut off from the trees before their buds begin to swell, which is generally three weeks or a month before the season for grafting. They may be buried in ground half their length, and their tops covered with dry litter. If a small joint of the former year's wood is cut off with the scion, it will preserve it the better, and be more likely to take when grafted. If the scions are to be carried any considerable distance, it will be best to stick their lower end in a potato, or a lump of well-tempered, moist clay, and then wrap them up in moss, which will preserve them fresh a month, or longer.

The best grafts are from trees raised from seed; next, those raised from cuttings; but those of trees raised from suckers should be rejected. They should be shoots of the last year's growth, and should be chosen from the outside lateral branches of healthy trees. The middle part of each shoot makes the best scions; but long shoots, and especially where the scion is of a rare variety, may be cut into several scions of four or six inches in length, reserving not fewer than two, nor more than five eyes to form the future head of the tree.

The *best stocks* are such as have been allowed much room in the nursery; those planted very close have the wood soft, and the grafts on them are not fruitful.

The materials for grafting are, a strong pruning knife for cutting off the heads of the stocks, previous to their preparation by the grafting knife, for the scion; a small saw for large stocks; and a penknife for very small scions; a chisel and mallet for cleft grafting; bands or strings to tie the grafts with; and grafting clay.

Grafting clay should be prepared at least ten days previous to its being wanted. Loudon directs to prepare it as follows. "Take either stiff yellow or blue clay, or clayey loam or brick earth; in either case adding thereto about a fourth part of fresh horse-dung, free from litter, and a portion of cut hay, mixing the whole together, and adding a little water; then let the whole be well beaten with a stick [or wrought with a hoe] upon a floor, or other hard substance; and, as it becomes too dry, apply more water, at every beating turning it over; and continuing beating it well at top till it becomes flat and soft. This process ought to be repeated more or less, according as the nature of the clay may require to render it ductile, and yet not so tough as to be apt to crack in dry weather: for instance, it should be several times beaten the first day; and the next morning repeat the beating, still moistening it with water; and by thus repeating the beating several times every day, for two or three days, or every other day at least, for a week, it will be in proper order for use; observing that it should be prepared a week at least before it is used; but if a month, the better, keeping it moist. Some recommend salt to be mixed with the clay, and others, ashes or lime, rubbish or drift sand; the object in these cases being to prevent its cracking with the sun; which, however, the horse-droppings, if well incorporated, will, in general, prevent."

The grafting clay of the French and Dutch is composed of half cow-dung, free from litter, and half fresh loam, equally incorporated. They prefer this to all others for excluding the external air from wounds in trees, &c. of every description, and ridicule the idea of certain complex compositions. A French writer on agriculture observes of a noted English composition, (Forsyth's, we believe,) that it is "so complicated and ridiculous in the eyes of those who have any knowledge of chymistry or natural philosophy, that it is a matter of astonishment how it could be proposed in our age."

Substitutes for grafting clay.—These are numerous. Some of them are specified by Loudon, (*Encyc. of Gard.* p. 397,) and in *Thacher's Orchardist*, p. 37, *second* ed. But we have been assured by practical orchardists that most of these are injurious. The pitch, tar, rosin, or turpentine, which composes part of the composition of most or all of them, is injurious to vegetation, and will not withstand the heat of summer.

There are various modes of grafting, of which we shall describe some of the most common.

1. *Whip-grafting*, or, as it is sometimes called, *tongue-grafting*, is most commonly practised in nurseries upon small stocks. The stocks and the scions should be of the same or nearly the same size They are both to be sloped

off a full inch or more, and then tied closely together. This method may be much improved by performing what gardeners call *tongueing* or *tipping;* that is, by making an incision in the bare part of the stock, downwards, and a similar slit in the scion, upwards: after which, they are to be carefully joined together, so that the rinds of both may meet in every part, when a ligament or bandage of bass is to be tied round the scion, to prevent it from being displaced, and the whole is to be covered over, or coated over with the grafting clay above described.

2. *Cleft-grafting*, or *slit-grafting*, is performed on stocks from one to two inches diameter. The head of the stock being carefully cut off, in a sloping direction, a perpendicular cleft, or slit, is to be made about two inches deep, with a knife or chisel, towards the back of the slope, into which a wedge is to be driven, in order to keep it open for the admission of the scion: the latter must now be cut in a perpendicular direction, and in the form of a wedge, so as to fit the incision in the stock. As soon as it is prepared, it should be placed in the cleft, in such a manner that the inner bark of both the stock and scion may meet exactly together. It is then to be tied with a ligature of bass, and clayed over, as is practised in *whip-grafting*, three or four eyes being left in the scion uncovered. It should be observed, that, in making the cleft in the stock, care should be taken not to injure the pith, the scions being inserted in the sap-wood of the stock or branch.

3. *Crown-grafting* is commonly practised upon such stocks as are too large and stubborn to cleave. It is sometimes called grafting in the bark or rind, from the scion being inserted between the bark and wood. This mode of grafting is performed with best effect somewhat later than the others, as the motion of the sap renders the bark and wood of the stock much more easily separated for the admission of the scions. First cut or saw off the head of the stock or branch horizontally, or level, and pare the top smooth; then, having the scions, cut one side of each flat, and somewhat sloping, an inch and a half long, forming a sort of a shoulder at the top of the slope, to rest upon the crown of the stock; and then raise the rind of the stock with the ivory wedge, forming the handle of the budding knife, (or some other suitable implement of a wedge-like shape,) so as to admit the scion between the bark and the wood two inches down. Then place the scion with the cut side next to the wood, thrusting it down far enough for

the shoulder to rest upon the top of the stock; and in this manner may be put three, four, five or more scions, in one large stock or branch. It is alleged as a disadvantage attending this method, in exposed situations, that the ingrafted shoots, for two or three years, are liable to be blown out of the stock by violent winds; the only remedy for which is, tying long rods to the body of the stock or branch, and tying up each scion and its shoots to one of the rods.

4. *Side-grafting* resembles *whip* or *tongue-grafting*, but differs in being performed on the side of the stock, without heading down. It is practised on wall-trees to fill up vacancies, and, sometimes, in order to have a variety of fruits upon the same tree. Having fixed upon those parts of the branches where wood is wanting to furnish the head or any part of the tree, there slope off the bark and a little of the wood, and cut the lower end of the scions to fit the part as near as possible; then join them to the branch, tie them with bass, and clay them over.

5. *Saddle-grafting* is performed by first cutting the top of the stock into a wedge-like form, and then splitting up the end of the scion, and thinning off each half to a tongue-shape; it is then placed on the wedge, embracing it on each side, and the inner barks are made to join on one side of the stock, as in *cleft-grafting.* This is a very strong and handsome mode for standard trees, when grafted at the standard height. It is also desirable for orange-trees and rose-standards, as it makes a handsome finish, covering a part of the stock, which, by the other methods, long remains a black scar, and sometimes never becomes covered with bark. The stocks for this purpose should not be much thicker than the scions, or two scions may be inserted.

6. *Root-grafting* is sometimes performed, in nurseries, on parts of the roots of removed trees, when the proper stocks are scarce; and in which case the root of the white-thorn has been resorted to, as stock both for the apple and pear. In general, however, a piece of the root of the tree of the same genus is selected, well furnished with fibres, and a scion placed on it in any of the ordinary ways for grafting small stocks. Thus united, they are planted so deep as to cover the ball of clay, and leave only a few eyes of the scion above ground. "A variety of this kind of grafting, practised by Knight, is thus described: 'Transplanting, many years ago, some pear-stocks from a seed-bed, of which the soil was soft and deep, I found that the first-

emitted roots of many of them descended a foot or more perpendicularly into the earth, before they divided into any lateral ramifications; and, as I did not like to replant the young trees, with such an inconvenient length of perpendicular root, I cut off about six inches from each. The amputated parts were then accurately fitted and bound, as in *splice* or *whip-grafting*, to scions of pear-trees, which were selected as nearly as possible of the same size; and the roots, with their attached branches, were deposited in the ground as cuttings, so deep that the whole of the root and about an inch of the scion were covered. The soil was then drawn up with the hoe on each side of the plants, which were placed in rows, so that one bud only of each plant was above the soil, and the other just within it. These grafts succeeded perfectly well; and I have subsequently repeated the same experiment, with equal success, upon the apple, the plum, and the peach. In the greater part of these experiments, the roots were perfectly cleansed from mould by washing, before they were fitted to the graft, and were then placed in wet moss, till a sufficient number were ready to be carried to the nursery; a common dibber only was employed in planting them; but the mould was washed into the holes with water, to close it well round the roots, and to supply the place of the clay, used in other methods of grafting.'—*Hort. Trans.* vol. i. p. 239. A variation of this mode consists in leaving that part of the tap-root not wanted, with the removed tree, undisturbed in the soil, and grafting on it there. Such root-grafts grow with uncommon vigour."—*Loudon.*

The time of the year for performing the above kinds of grafting should be, when the sap of the stock has begun to move, in the spring, and just before the buds are unfolded.

7. *Summer-grafting.* A letter from Abner Landrum to the editor of the *American Farmer*, contains the following observations on this subject: "About the 1st of July, when the growth of some trees had become stationary, I cut a twig of the pear-tree, and inserted it on a nursery stock, which readily grew off. I next tried almost every variety of orchard fruits, which succeeded perfectly well. I was induced to make this experiment from the rationality of the theory, it having occurred, upon the slightest reflection, that failures in spring-grafting might originate from the dissipation of moisture by the drying winds peculiar to that season, before the sap of the stock acquires sufficient motion to furnish the graft with due nourishment; but from the rapid

motion of the sap in some stocks, with the general moisture of the air during midsummer, the operation would seldom fail; and the result fully proved this conclusion well founded. It next occurred to me, that the walnut, fig, and persimon, which will not succeed in the spring, except by mere chance, might now answer on the same principle of reasoning: I accordingly made the experiment, and succeeded.

"To make the success of *summer-grafting* certain, take the twigs to be inserted from a tree in which the sap is, as near as possible, stationary; and select a stock in which the sap has the greatest possible motion. July is the proper time for summer-grafting, and indeed the most suitable month of the twelve for that operation. However, the operation may be performed, with tolerable success, during the remainder of the summer and fall months."

8. Another mode of engrafting has been practised, and we believe invented, by Col. J. F. Wingate, of Bath, in the state of Maine. The process and its advantages are thus described in a letter from Col. Wingate to Gen. H. A. S. Dearborn:—"The instrument best adapted to the purpose, and which I have generally made use of in the operation, is a common budding-knife, the handle of which, being smooth and thin, is well designed for separating the bark from the wood of the stock; and this is performed and the scion inserted in the following manner, namely; in the first place, make a horizontal or transverse cut upon the stock or limb to be engrafted, according to its size, from one half to one and a half inch in length. Then at the left end (this being the most convenient) make a perpendicular cut downward, (through to the wood in both cases,) about the same length; take a small chip from the bark just above the horizontal line, or cut at the place where the scion is to be fixed, deep enough to allow the lower or wedge part of it to meet and lay close to the inner bark or sap-wood of the stock. Raise the bark as in budding, and separate it sufficiently from the wood to receive the scion, which should be gently pressed into the proper position, and there secured by slips of bass mats, or some other soft material, wound around the limb or stock so as to cover the lower part of the scion, and press upon the bark of the tree the whole length of the perpendicular cut; after which I have generally rubbed on a thin coat of engrafting composition, for the purpose of excluding the dew and rain. That which I have found most durable and effectual for this purpose is

made of equal parts of rosin, lard, and beeswax. When cold, it may be cut in thin slices as required for use, warmed in the hand sufficiently to apply and adhere to the wood,—will yield to its growth, and remain until the wound is entirely healed. The scion should be of the usual length, exposing from three to five buds: the part inserted is cut in the wedge form, very much as in the ordinary cleft-grafting, except that the inner side must be bevelled to a proud edge to prevent its injuriously opening the bark of the stock beyond the scion, and opposite to the perpendicular cut. In some of my early experiments, I made a shoulder to the scion to rest upon the outside bark of the stock; but this proved entirely useless, as the scion invariably first took on the inner part, from the ascending sap, except in one instance, in which I reversed the scion, and inserted the top downwards, when, after some delay, it appeared, so far as I could discover the adhesion, to take from the returning sap in the outer bark; but as I made only a single experiment of this kind, and the scion was accidentally removed soon after it had taken, I am unable to give you any additional facts respecting it, which might be either useful or interesting.

"I will now state what I conceive to be the advantages of the present over the ordinary mode of engrafting and of budding. Among the most important, I may perhaps say, that it can be performed with more ease and with greater facility,—that the scion takes more readily and grows more rapidly,—that it may be inserted in any part of the trunk or limb of the tree, without amputating or otherwise injuring it, and where the other mode cannot be easily performed. If it take, the necessary pruning may be made at any subsequent period, and if it fail, the wound in the bark is soon closed, the tree is not disfigured, neither is it retarded in its growth, nor is the quantity of its fruit, if it be in bearing, diminished. Thus it may be said to have all the advantages of budding, with the additional one of producing the new fruit certainly one, and probably two or three years sooner; and further, it may be successfully performed at any season of the year while the sap is in motion, and the scions taken from the growth of the same or of the preceding year. It will be found, too, that the stock is less injured, heals more readily and effectually, than when split as in the ordinary mode of cleft-grafting. All the branches of a tree may be removed clean to the trunk, and new ones produced, and any shape or form given to the tree by the insertion of scions at such places as you please. And I am certain that they adhere more firmly, and are less liable to injury from rain or violent winds, than those inserted in a different manner; and, if properly inserted, probably not one in fifty will fail.

"On one tree, to which I gave an entire new top last year, and which had never before blossomed, several fine apples were produced and ripened in perfection, although the scions blossomed about one month later than the parent tree. I ought, perhaps, to add, that one cause of the success and extraordinary growth of some of the scions I have inserted in this way is doubtless the severe pruning I have given the trees about the time they were engrafted; and it may be proper to state, that I have experimented only upon apple-trees, although I am aware of no reason why this mode should not answer equally well on most other kinds of fruit-trees, where budding and grafting could be successfully performed. I have sent you by the packet a specimen of the new mode of engrafting, which is indeed of very extraordinary growth; the scion was inserted the 5th of September, 1824, being the growth of the same year: the leaves of that season died and dropped off, new ones were disclosed, and new buds formed the same autumn, and the two branches are the entire growth of last year, and of the following dimensions, namely; main branch, five and a half feet in length; secondary, four feet and a half; circumference of main branch at the base, 2⅞ inches; the other somewhat less. I have taken off some of the wood of the tree in the bark, of which the scion was inserted, in order that you may perceive how firmly and perfectly it has united with the main stock, which was a scrub apple-tree, and in which two or three scions were likewise inserted in the ordinary mode, whose growth, I think, is less than one half of the one sent you, engrafted in the new way."

Future treatment.—In a month after grafting, it may be ascertained whether the scion has *united* with the stock, by observing the progress of its buds; but, in general, it is not safe to remove the clay for three months or more, till the graft be completely cicatrized. The clay may generally be taken off in July or August, and at the same time the ligatures loosened, where the scion seems to require more room to expand; a few weeks afterwards, when the parts have been thus partially inured to the air, and when there is no danger of the scion being blown off by winds, the whole of the ligatures may be removed. If the stock was not shortened down close to the graft, or junction of the scion with the stock, at the time of the operation, it may be done now, or as soon as the ligatures can be entirely dispensed with. In particular cases, a ligature round the graft, or a stake or other prop, for the shoots of the scion, may be necessary for a year to come, to protect against winds; or a bandage of moss kept over the graft, to preserve moisture, and encourage the expansion of the parts, and complete the filling up of the wound.—*Loudon.*

Effects of grafting.—The nature of the fruit is, to a certain extent, affected by the nature of the stock. Miller says decidedly, "that crab-stocks cause apples to be firmer, to keep longer, and to have a sharper flavour; and he is equally confident, that, if the breaking pears be grafted on quince stocks, the fruit is rendered gritty or stony, while the melting pears are much improved by such stocks. This, according to Neill, is scarcely to be considered as inconsistent with Lord Bacon's doctrine, 'that the scion overruleth the graft quite, the stock being passive only;' which, as a general proposition, remains true; it being evident, that the scion, bud, or inarched shoot, is endowed with the power of drawing or forming from the stock that peculiar kind of nourishment which is adapted to its nature, and that the specific characters of the engrafted plant remain unchanged, although its qualities may be partially affected."—*Ed. Encyc.* art. *Horticulture.*

GREEN-HOUSE.—A green-house is a building designed to protect, during winter, such exotic plants, shrubs, and trees, as will bear being exposed to the open air during summer, but are too tender for such exposure in winter.

J. W. Watkins, Esq. of New York, gives the following plan for the construction of a green-house, in the *Trans. of the Agric. Soc.* of the above state:—

"The building should be sunk in the earth from two to four feet, in proportion to the size of the house, and according to the nature of the soil; as clay retains moisture, and of consequence produces damps, in such ground it should not be so deep. The height should not exceed twelve feet from the exterior ground, by which it will be less exposed to high winds. The width should not exceed sixteen or eighteen feet, as the sun's rays are, at that distance from the glass, very feeble. A south front is well known to be the true one, but advantage should be taken of glazing as much of the eastern end as possible, for the benefit of the morning sun. The front should decline northward from a perpendicular with the horizon, so as the angle made thereby with the horizon will, at noonday in winter, bring the rays of the sun to strike the glass at right angles, and the roof should descend the opposite side without a break. By this position of the roof and glass, the rays of the sun are thrown upon every part of the inside of the house, and the whole becomes heated thereby; more of the rays are also introduced into the building, and when the sun produces most heat during the day, there is no reflection of its rays, and at other parts of the day, the reflecting angle, being obtuse, does not powerfully cast off the rays. The inside of the rafters of the roof should be lined with boards, and the space between that and the roof filled with a mixture of straw, sand, and clay, made into mortar; boards should be used in preference to shingles, as, making fewer breaks in the roof, less opportunity is given for the admission of cold air. The residue of the building may be of stone or brick work, or a frame building filled in with bricks, and no flooring of any kind upon the ground. Shutters on the outside are sufficient; and it is preferable to have them hung on hinges, as the least troublesome, to the common practice of sliding ones: they should be made to fold into the spaces between the windows.

"Before putting the plants into the house, the bottom should be covered with bark from a tan-vat, about a foot deep, according to the depth the building is sunk in the earth.

"The advantages proposed by this method of constructing are, the lessening the expense of building; that, the heat of the sun being sufficient to warm the house, the trouble and expense of warming it by a stove is avoided, which unless very carefully attended, the plants may be injured by too much heat, and are always by the smoke that unavoidably makes its way out of the pipes. It would be proper, nevertheless, to make arrangements in constructing the house for using a stove, in case a long succession of cold, cloudy days, by obscuring the sun, should reduce the heat in the house below that degree of temperature necessary for preserving the plants, which is a case that will seldom happen, as one clear day will warm the house sufficiently to admit its being shut up for several days.

"Plants in a house of this kind require less water, and do not suffer for the want of atmospheric air. It is probable, as the earth is charged with electric fluids, as egetable substances are known conductors of it, that the bark, by its fermentation, not only generates heat, but serves as a mean to produce out of the earth an atmosphere for the plants, sufficient, with such atmospheric air as will find admission, to supply the quantity exhausted by the daily rarefaction occasioned by the sun's heat.

"A green-house has been used upon this construction in this state, without having had the least occasion of being heated by fire. The plants in the spring were remarkably thrifty; tropical fruit ripened in it during the winter, and young fruit formed on the trees. It required no other care, than now and then watering the plants, and shutting the windows as soon as the sun left them."

With respect to the management of plants in green-houses, it is recommended occasionally to open the mould in which they are set, to scatter a little fresh earth on the pots, and over this to lay a little dung. It will also be advisable to water them when the leaves begin to curl or wither, and to pluck off such as are decayed; but these operations should not be too frequently repeated.

"Some people," says M'Mahon, "are desirous of keeping out their plants as long as possible; this is very right, but it ought not to be extended to too hazardous a period; for one night's frost would cause the leaves to lose their fine green colour, which perhaps might not be restored during the whole winter; and, if any way severe, serious injury might be sustained.

"If the windows and doors are kept open day and night, as long as there is safety in so doing, the plants will be nearly as well off as in the open air, and no danger is encountered: the mere difference of five or six days in the taking in of the plants will ensure safety; but, on the other hand, it is not right to be too precipitate in housing them, before the common appearance of the weather indicates the necessity."

HAWTHORN.—*Cratægus.*—There are a great many species of this genus of plants, (*see* HEDGE,) of which the *oxycantha*, or English hawthorn, as it is commonly named in the United States, is most generally cultivated for the purpose of forming hedges. The manner of raising the thorn quicks is as follows:—

Collect your seeds in autumn, mix them with equal quantities of light, sandy earth, and lay them in that state on the surface of a dry spot of ground in your best enclosed garden, where they cannot be disturbed by hogs, &c.; form this mixture into a narrow, sloping ridge, tapering to the top, and cover it with light, loose earth, two inches thick all over; the April following, turn this ridge, mixing the whole together, and form it again the same way, covering in like manner as before, with two inches deep of light, loose earth; repeat this again in the months of July and August, by which the seeds in every part will be equally prepared for vegetation. A trench must be cut round this ridge, to prevent any water from lodging about the seeds; for this would rot many and injure others especially in the second winter, when the stones would be losing their cementing quality, and begin to open; for until this is effected the kernels cannot vegetate. Hence the necessity and great advantage of not burying the stones in the earth, as is injudiciously practised by many.

There is not the least danger to be apprehended from frost injuring the seeds, whilst so much exposed to it in those ridges; however, it will not be amiss to strew a light covering of long litter over them on the approach of winter; which will keep them dry, and in a better state for sowing when the season arrives.

"Your haws being prepared as above, make ready a piece of good rich ground, neither upon an elevated situation, nor too low; in the former the summer drought would be unfriendly, and in the latter they would be subject to mildew: this must be done as early in the spring as you can get the ground to work freely, and pulverize well, for the haws begin to throw out roots at a very early period; and if not sown at this time, or before, a great number of these roots will be broken off in the act of sowing, and thereby totally lost; the others which escape this accident, having their radicles extended on the surface, penetrate the earth at the extreme points of those roots, forming right angles with the parts already produced, by which means they can never drive up the seed leaves with as much vigour as if the radicles descended immediately in a perpendicular direction from the stones of the fruit; hence the necessity of early sowing.

"The ground, however, must not be wrought while wet, or at least the seeds should not be covered with wet or heavy earth, nor too deep, for if the surface should cake, or become stiff in consequence of dry weather ensuing, few of these young plants, having broad seed leaves, could bear up through it; therefore, you must be very cautious in that point, and if the earth of your bed is not light and dry enough for this purpose, you must carry as much as will cover the seeds from some dry compost heap, or some quarter of the garden, where it can be found in a suitable condition.

"On examining your haws, if you find the earth in which they are mixed any way clogged with too much moisture, so that the parts and seeds would not separate freely in the act of sowing; mix therewith a sufficient quantity of slaked lime, or wood-ashes, to accomplish that end.

"Having every thing in readiness, and your ground well dug, *and raked effectually as you proceeded in the digging*, still presuming that it is in the best possible state of preparation, lay it out into four feet wide beds, leaving twelve or fourteen inches of an alley between each, and with the back of the rake push off into these alleys about three quarters of an inch of the fine raked surface of the beds, one half of each bed to the one side, and the other to the opposite; this done, sow your haws thereon, earth and all, as they had lain, so thick that you may expect a thousand plants at least, after every reasonable allowance for faulty or imperfect seeds, (there being many of these,) on every three or four yards of your beds;—I have often had that number on as many feet;—then with a spade or shovel cast the earth out of the alleys evenly over the beds, covering the seeds not more than three quarters of an inch deep, and not more than half an inch, if the earth be any way stiff; after which rake the tops of the beds *very lightly*, taking care not to disturb the seeds, in order to take off the lumps, and to give a neat appearance to the work."—*M'Mahon.* If any stiffness of the ground is perceived, the beds should have frequent and *gentle* waterings; and great care will be necessary to keep the beds free from weeds from the moment the plants appear above ground till they are fit to be planted in hedge-rows, and have arrived at such a size that weeds cannot materially injure them.

Mr. Kirk, of Brandywine, has been successful in making the seeds of the American thorn vegetate, by washing them clean, putting them in hot water to swell them, and exposing the water in which they were immersed to be frozen and thawed several times. Dr. Mease, of Philadelphia, says, "The haws of the Washington thorn, *Cratægus cordata*, require to be buried one winter before they sprout, and they should be put into the ground the same autumn they are taken off the tree; the pulp which surrounds them having been previously rubbed off and the stone washed. The usual way is to put them in a box of sand, and to stand it under the eaves of a house, to receive the dropping of water from it, and by the spring they will be open and ready for planting."—*Mem. Phil. Agr. Soc.* vol. iii. p. 439. *See further*, HEDGES.

Insects.—A great enemy to the hawthorn is the *borer*, (*saperda bivitata*,) the same which infests apple-trees, &c.; and we know of no method of guarding against its ravages. It is said, however, that this insect has never made its appearance in the interior parts of the United States, and is to be found only within the distance of a few miles from the sea shore.

HEADING DOWN FRUIT-TREES.—"When any fruit-trees have begun to decline, and are thin of young wood, you may often restore them by heading down such limbs as are in the worst state to those parts where young shoots appear, and close to the most vigorous; but this should not be done, generally, the same season, lest it give such a sudden check to the sap as totally to destroy the tree. But if every other branch all over the tree were headed at proper lengths, each close to some young shoot, new, healthy wood would be produced, which would soon come into bearing. The next spring after the first branches were headed, the remaining old branches may be cut out, as directed above; after which the head of the tree will soon be filled with bearing wood, which may afterwards be pruned as directed for other trees."—*McMahon.*

HEDGES.—A great variety of shrubs and trees have been made use of for hedges, among which are various kinds of thorns, such as the *Cratægus oxyacantha*, or common European hawthorn, or white thorn; the *Cratægus coccinea*, or great American hawthorn; the *Cratægus crus-galli*, or cockspur hawthorn; the *Cratægus cordata*, or American hedge thorn; crab and apple-trees, horn-beam, beech, honey-locust, buckthorn, holly, white mulberry, juniper, red cedar, &c. &c.

Mr. Quincy, of Massachusetts, has given a statement of his mode of making hedges of the *Cratægus cordata*, which was published in the third volume of the *Mass. Agr. Rep.* p. 27. The seedling thorns (ten thousand) were obtained from the nursery of Thomas Main, near Georgetown, D. C., and planted in a hedge-course of two hundred and fifty-five rods, so far as was necessary to fill that extent in one line, each plant being five inches apart. The residue were planted in a nursery, for the purpose of filling vacancies.

The hedge-course was made in sandy land, ploughed of the width of four feet, and manured and prepared precisely as for Indian corn; except, only, that, after ploughing, the centre, for two feet wide, was turned over with the spade, and the hedge planted without further preparation. Mr. Quincy advises to the following course:—"Plough the hedge-course *six feet* wide. Plant the whole course one year to potatoes. This pays for the labour as much as other land thus planted. Set the thorns *eight inches* apart. This is near enough in a country like this, where hogs are not permitted to run at large, and makes a considerable saving in labour as well as the cost of the plants. Keep both sides of the hedge planted with potatoes, during the whole six years that the hedge is coming to perfection. The potatoes will nearly pay the cost of the labour. The manure for the potatoes benefits the hedge; and, while hoeing the potatoes, keeping the hedge clear of weeds is easy.

"To keep the hedge clear of weeds, and to fill up the vacancies regularly in the spring of every year, with plants of the same age with those of the original hedge, are the two essential objects of attention after the hedge-course is prepared, and the plants are set. Younger plants may answer, but whoever would make a hedge, in the most speedy and perfect manner, ought to procure, at the time of obtaining the plants for the original hedge, a sufficient extra number to supply all deficiencies likely to occur during the whole time the hedge is forming; to be kept at a nursery, thriving, if possible, a little better than those in the hedge-course."

With respect to the age at which plants for hedges ought to be used, Loudon says, "Three years old are certainly the youngest that should be transplanted, and if they are six or seven years old, so much the better; the prevailing idea that plants of that age will not thrive, if transplanted, is totally unfounded." He likewise recommends assorting the plants, and setting those together which are nearly of a size; because, "when no pains have been taken in assorting the plants, and they are planted promiscuously, great and small, strong and weak, the consequence is, that the strongest plants very soon outgrow such as are weaker, and not only overtop them, but also deprive them of that nourishment which they so much require. As the hedge advances in age, the evil becomes greater; small, stunted plants and innumerable gaps appearing throughout the whole line of the fence, interspersed with others remarkable for their strength and luxuriance.

"This assorting of hedge-plants has another advantage, namely, that of putting it in the power of the person, who plants the hedge, to put down the large, strong, healthy plants upon the poorest parts of the line of fence, and to set such as are smaller and weaker upon the richer and more fertile parts. He has it also in his power, by a more careful preparation of the soil, and bestowing a greater proportion of manure on the places where the plants are set, to give them that nourishment and assistance which they require, and which would very soon enable them to form a fence equal to that part occupied by the strongest plants."

Hedges may be of various kinds, such as the single hedge and ditch; the hedge and bank; the level hedge, &c.; of which, descriptions may be found in Loudon's *Encyclopedia of Agriculture*, and other books of husbandry.

It is often found necessary to plash or interweave the branches of hedges. Some advise to cut off the tops, or head them down to about three feet, or three feet and a half from the ground, when the plants are about four years old, &c. &c. See *Loudon's Encyc. of Agr.; Farmer's Assistant; Willich's Dom. Encyc.; Mem. of N. Y. Board of Agr.* vol. ii. p. 161.

A writer in the *Mass. Agr. Rep.* says, "The best plant for hedges, so far as the experience of one of our cultivators, Ezekiel H. Derby, will go, and he has tried it for many years, is the buckthorn. It makes a close, beautiful hedge, and is not subject to any disease, nor the depredations of any devourer, so far as we yet know." *See* art. BUCKTHORN, p. 56.

HOEING.—"The ends to be answered by hoeing are chiefly these:—1. To destroy weeds, which are always ready to spring up in every soil, and which would rob the cultivated plants of most of their food. Scraping the surface, if it be done frequently, may answer this purpose; but to destroy the roots of weeds, deeper hoeing is necessary.—2. To keep the soil from becoming too compact, which prevents the roots from extending themselves freely in search of their food; at the same time keeping up a fermentation, by which the vegetable food is concocted, and brought into contact with the roots. For this purpose, the deeper land is hoed, the better. But hoeing should cease, or be only superficial, when the roots are so far extended as to be much injured by hoeing. They will bear a little cutting without injury. For where a root is cut off, several new branches will come in its place.—3. To render the soil more open and porous, so that it shall greedily drink in the nightly dews, and that rain may not run off, but readily soak in as it falls, and be retained. Accordingly, the more and oftener land is hoed, the more moisture it retains, the better it bears drought, and the more its plants are nourished.—4. Another design of hoeing, and which has not been enough attended to, is, to nourish plants by drawing fresh soil near to them, the effluvium of which enters their pores, and increases their growth. At the same time the earthing of plants makes them stand more firmly, and increases their pasture in the spots where the roots most abound; and prevents the drying of the earth down to the roots."—*Deane.*

HORSE-RADISH.—*Cochlearia Armoracia.*—The following instructions for cultivating horse-radish are by Knight, a celebrated English horticulturist:—"Horse-radish thrives best in deep, soft, sandy loam, that is not very dry in summer, nor inundated in winter; the situation must be open. During winter, [or in autumn,] trench the ground three feet deep; and in the following February [as soon as frost will permit in this country] procure your sets, in the choice of which take the strongest crowns, or leading buds, from old plants, cutting them about two inches long. Mark out the ground in four feet beds, and one foot alleys; then take from the first bed nine inches of the top soil, laying it upon the adjoining bed; after which take out an opening at one end of the bed, in the common way of trenching, fifteen inches deep from the present surface; then level the bottom, after which plant a row of sets across the bed at nine inches apart, each way, with their crowns upright; afterwards dig the next trench the same width and depth, turning the earth into the first trench, over the row of sets; thus proceeding, trench after trench, to the end. Where more than the produce of one bed is required for the supply of the family for twelve months, the third bed is next to be planted, which treat as directed for the first, only observing to lay the earth on the fourth, and so on to any number of beds. Upon every alternate bed, which is not planted, a dwarf annual crop may be grown. The plants must be kept clear from weeds during summer; and as soon as the leaves decay in autumn, let them be carefully raked off with a wooden-toothed rake; in the following February, [or as soon as frost will permit,] eighteen inches of the earth of the unplanted bed must be laid, as light as possible, and equally, over the beds that are planted; then trench and plant the vacant beds exactly in the same manner as before directed. The following autumn, the first-planted horse-radish may be taken up, by opening a trench at one end of the bed, to the bottom of the roots, so that the sticks or roots of horse-radish may be taken up entire and sound, which, for size and quality, will be such as have not generally been seen. The following February, [March or April,] the one year old crop will require additional earth, as before directed, which must of course be taken from those beds, which are now vacant, which when done, if the ground appears poor, or unlikely to produce another vigorous crop, they must have a coat of manure."—*Hort. Trans.* i. 207.

"Judd has also written on the culture of horse-radish, (*Hort. Trans.* v. 302,) and his practice, though very different from Knight's, is also excellent, and perhaps preferable. Knight takes strong buds from old plants, while Judd takes about three inches of the top part of each stick or root, and then cuts clean off about a quarter of an inch of this piece under the crown, so as to leave no appearance of a green bud. Judd trenches only two feet deep, and, if he applies manure, puts it in the very bottom of the trench; 'for, if not so done, the horse-radish, which always puts out some side roots, would send out such large side roots from the main root, in search of the dung lying contiguous, as materially to injure the crop. In planting, holes are made eighteen inches apart every way, and sixteen or eighteen inches deep. The root-cuttings are let down to the bottom of the holes, which are afterwards filled up with fine sifted cinder-dust, and the surface of the bed is then raked over. The season of planting is the latter part of March.' The essential difference between Knight's plan and Judd's is, that the former produces his root from the root-end of the cutting downwards, and the latter from the bud-end upwards: hence the one plants near the surface, and the other near the bottom of the trench. Judd's mode seems more certain of producing one entire strong root than Knight's."—*Loudon.*

Use.—The root, when scraped into shreds, is much used at the table as a condiment for fish, roast beef, &c. If intended for immediate use, it should, says Willich's *Domestic Encyclopedia.* "be dug out of the ground *fresh*, only from October to March, or be gathered in the spring; then dried, reduced to powder, and preserved in bottles closely stopped for occasional use; when it should be previously moistened with spring water. When steeped and digested in vinegar during a fortnight, this root is said effectually to remove freckles in the face." It is likewise recommended in cases of dropsy, scurvy, rheumatism, palsy, &c.—*Phillips' History of Vegetables.*"—*New England Farmer*, vol. v. pp. 269, 270.

HOT-BED.—A hot-bed, in gardening, is a small bed or mound of earth, composed of certain substances, which, by their fermentation, give warmth to vegetables or seeds, set or sowed in them, and thus hasten their growth. The fermenting substances used for forming hot-beds are, stable litter or dung, in a recent or fresh state, tanners' bark, leaves of trees, grass, and the herbaceous parts of plants generally.

"Stable dung is in the most general use for forming hot-beds, which are masses of this dung after it has undergone its most violent fermentation. These masses are generally in the form of solid parallelograms, of magnitude proportioned to the frames which are to be placed on them, the degree of heat required, and the season of the year in which they are formed.

"Tanners' bark is only preferred to dung because the substance, which undergoes the process of putrid fermentation, requires longer time to decay. Hence it is found useful in the bark-pits of hot-houses, as requiring to be seldomer removed or renewed than dung, or any other fermentable substance, that can be procured in equal quantity.

"Leaves, and especially oak leaves, come the nearest to bark, and have the additional advantage, that, when perfectly rotten, like dung, they form a rich mould, or excellent manure; whereas, rotten tanners' bark is found rather injurious than useful to vegetation, unless well mixed with lime and earth.

"*Preparation of manures.*—The object of preparation in these three substances being to get rid of violent heat, which is produced when the fermentation is most powerful, it is obvious, that preparation must consist in facilitating the process. For this purpose, a certain degree of moisture and air in the fermenting bodies is requisite; and hence the business of the gardener is, to turn them over frequently, and apply water when the process appears impeded for want of it, and exclude rain when it seems chilled and im peded by too much water. Recent stable dung generally requires to lie a month in ridges or beds, and be turned over in that time thrice, before it is fit for cucumber beds of the common construction. But for linings, or for frames with moveable bottoms, three weeks, a fortnight, or less, will suffice; or no time at all need be given, but the dung formed at once into linings. Tan and leaves, in general, require a month; but much depends on the state of the weather, and the season of the year. Fermentation is always most rapid in summer; and if the materials are spread abroad during frost, it is totally impeded.

"The formation of the dung-beds is effected by first marking out the dimensions of the plan, which should be six inches wider on all sides than that of the frame to be placed over it; and then, by successive layers of dung, laid on by a fork, raising it to the desired height, pressing it gently and equally throughout. In general, such beds are formed on a level surface; but Knight's mode is, to form a surface of earth as a basis, which shall incline to the horizon, to the extent of fifteen degrees: on this he forms the dung-bed to the same inclination; and, finally, the frame, when placed on such a bed, if, as is usual, it be deepest behind, will present its glass at an angle of twenty degrees, instead of six or eight; which is, undoubtedly, of great advantage in the winter season. This seems a very desirable improvement, where light is an object, which it must be in a high degree in the case of the culture of cucumbers and melons, as well as in forcing flowers.

"Ashes are often mixed with the dung of hot-beds, and are supposed to promote the steadiness and duration of their heat, and at first to revive it if somewhat decayed. Tan and leaves have been used for the same purpose; and it is generally found, that about one third of tan and two thirds of dung will form a more durable and less violent heat than a bed wholly of dung. The heat of dung-beds is revived by linings or collateral and surrounding walls or banks of fresh dung, the old dung of the bed being previously cut down close to the frame. These linings, as before observed, require less preparation than the dung for the beds. The dung-bed, being formed, and having stood two or three days with the frame and lights placed over it to protect it from rain, is next to be covered with earth of quality, and in quantity, according to the purpose to which it is to be applied. In severe weather, the sides of the bed are often protected by bundles of straw or fagots, which tend to prevent the escape of the heat."—*Encyc. of Gardening.*

HOT-HOUSE.—"A hot-house is a building intended to form a habitation for vegetables; either for such exotic plants as will not grow in the open air of the country where the building is erected, or for such indigenous and acclimated plants as it is desired to force or excite into a state of vegetation, or accelerate their maturation at an extraordinary season.

"Such heat as is required, in addition to that of the sun, is most generally produced by the ignition of carbonaceous materials, which heat the air of the house, either directly, when hot embers of wood are left in a furnace or stove, placed within the house, as in Sweden or Russia; mediately, as when smoke and heated air, from or passing through ignited fuel, is made to circulate in flues; or indirectly, when ignited fuel is applied to boil water, and the hot vapour, or water itself, is impelled through tubes of metal or other conductors, and either to heat the air of the house at once, as in most cases, or to heat masses of brick-work, sand, gravel, rubble, or earth, tan, or even water, (*Hort. Trans.* vol. iii.,) which materials may afterwards give out the heat so acquired slowly to the atmosphere of the house. But heat is also occasionally supplied from fermenting vegetable substances, as dung, tan, leaves, weeds, &c., applied either beneath or around the whole or a part of the house, or placed in a body within it."—*Encyc. of Gardening.*

Steam affords the most simple and effectual mode of heating hot-houses, and indeed large bodies of air in any building, and is the most convenient carrier of heat, which human ingenuity has ever discovered or employed.—See *Encyc. of Gardening*, from p. 310 to pp. 333, 502, &c.

HYSSOP.—*Hyssopus officinalis.*—This is a hardy plant, a native of the south of Europe, and grows to the height of about eighteen inches.

Propagation and culture.—"It is raised by slips and cuttings of the branches, and by slips of the root and top together. It likes a dry and sandy soil. When it is propagated by seed, sow in March or April a small portion, either broad-cast and raked in, or in small drills six inches apart. The plants may mostly be transplanted into final beds in June or July, nine inches apart, or some may be planted as an edging; or you may also sow some seed for an edging, to remain where sown. Give the edgings occasionally trimming in their established growth; cutting away also any decayed flower-spikes in autumn. You may take rooted offsets from established plants in March, April, August or September, cuttings from the stalks in April and May; also rootless slips of the young shoots in June or July. After May, shade for a time, or plant in a shady border. If for culinary purposes, the distance from plant to plant may be nine inches; in the physic garden, eighteen inches or two feet. Water at planting, and twice or thrice a week in dry weather till rooted."—*Abercrombie.*

Use.—The leaves and young shoots are occasionally used as a pot-herb, and the leafy tops and flower-spikes are cut, dried, and preserved for medicinal purposes. They are particularly recommended in humoral asthmas, coughs, and other disorders of the breast and lungs.

INARCHING.—This method of engrafting is used, when the stock intended to graft on, and the tree from which the graft is taken, stand so near (or can be brought so near) that they may be joined together. The method of performing the operation is as follows:—

Take the branch you would inarch, and, having fitted it to that part of the stock where you intend to join it, pare away the rind and wood on one side about three inches in length. After the same manner cut the stock or branch in the place where the graft is to be united, so that the rind of both may join equally together, that the sap may meet; then cut a little tongue upwards in the graft, and make a slit in the stock downward to admit it; so that, when they are joined, the tongue will prevent their slipping, and the graft will more closely unite with the stock. Having thus placed them exactly together, they must be tied with some bass; then cover the place with grafting-clay, to prevent the air from entering to dry the wound, or the wet from getting in to rot the stock; you should also fix a stake in the ground, to which that part of the stock, and likewise the graft, should be fastened, to prevent the wind from breaking them asunder. In this manner they should remain about four months, when the graft may be cut from the mother tree, sloping it off close to the stock, and at the same time covering the jointed parts with fresh grafting clay.

INDIAN CORN.—*Zea.*—We shall not undertake to state the various methods employed for the field-culture of this valuable vegetable, with which it is presumed our readers are, generally, acquainted. But as it is often wanted as a culinary article, for early use, and cultivated in gardens for the supply of the table, we will give M'Mahon's mode of raising it:—

"Procure some seed of the *earliest* kind, and select a piece of dry, sandy, and tolerably rich ground, in a warm exposure. After preparing it as for peas, &c. form shallow drills, about two inches deep, at the distance of six feet from each other; [four feet and a half, or five feet, will answer for the smallest sorts;] drop the seeds therein two feet and a half asunder, and two grains in each place; strew a little wood-ashes in the drills, and cover the seeds as you would peas. As the plants advance in growth, earth them up two or three times. For an early crop, you may plant the seed, in the Middle States, about the first of May, [about the 10th in the Eastern States,] or ten days earlier, should the season prove very favourable.

"This method is exclusively intended for the culture of the small early kinds."

INOCULATION, *or* BUDDING.—"The object in budding is the same as in grafting, and depends on the same principle; all the difference between a bud and a scion being that a bud is a shoot or scion in embryo.

"A new application of budding has been made by Knight. It is that of transferring 'a part of the abundant blossom-buds from one tree to the barren branches of others.' He tried this first on roses, and afterwards on pears and peaches, with much success.

"*Advantages of budding.*—Budded trees are generally two years later in producing their fruit than grafted ones; but the advantage of budding is that, where a tree is rare, a new plant can be got from every eye; whereas by grafting it can only be got from every three or four eyes. There are also trees, which propagate much more readily by budding than grafting; and others, as most of the stone fruits, are apt to throw out gum when grafted. When grafting has been omitted, or has failed, in spring, budding comes in as an auxiliary in summer.

"*Season of budding.*—The operation of common budding is performed any time from the beginning of July to the middle of August; the criterion being the formation of buds in the axillæ of the leaf of the present year. The buds are known to be ready by the shield or portion of bark, to which they are attached, easily parting with the wood. The buds preferred are generally those on the middle of a young shoot, as being neither so apt to run to wood as those at the extremity, nor so apt to lie dormant as those at the lower end. In some cases, however, the buds from the middle and extremity of the shoots are to be rejected, and those taken which are at the base of the annual shoots, as Knight (*Hort. Trans.* vol. iii. p. 135) found in the case of the walnut-tree. Scalope budding may be performed in the spring, or at any season.

" *Stocks for budding* may, in general, be much smaller than for grafting, as the operation may be performed on the same year's shoot. But it may also be performed on shoots or stems of several years' growth, and in such, by inserting a number of buds, a complete tree may be formed at once. Scalope budding may be performed on trees of considerable age.

" *Choice of buds.*—For gathering the shoots containing the buds, a cloudy day, or an early or late hour, should be chosen, on this principle, that the leaves, being at these periods in a less active state of perspiration, suffer least from being separated from their parent plant. They are preserved fresh, and may be sent a great distance by inserting their ends in water or moist moss; though in general they should be used as soon after gathering as possible; indeed, as in grafting and inarching, the whole operation ought to be performed with the greatest celerity.

" *Kinds of budding.*—Professor Thouin enumerates twenty-three species and varieties of budding; but we shall here describe only four, of which but one variety is in general use in Britain.

" *Shield-budding*, or T *budding*, is thus performed :—Fix on a smooth part on the side of the stock, rather from than towards the sun, and of a height depending, as in grafting, whether dwarf, whole or half standard-trees are desired; then, with the budding-knife, make a horizontal cut across the rind, quite through to the firm wood; from the middle of this transverse cut, make a slit downward, perpendicularly, an inch or more long, going also quite through to the wood. This done, proceed with all expedition to take off a bud; holding the cutting or scion in one hand, with the thickest end outward, and, with the knife in the other hand, enter it about half an inch or more below the bud, cutting near half way into the wood of the shoot, continuing it with one clean slanting cut, about half an inch or more above the bud, so deep as to take off part of the wood along with it, the whole about an inch and a half long; then, directly, with the thumb and finger, or point of the knife, slip off the woody part remaining to the bud; which done, observe whether the eye or gem of the bud remains perfect; if not, and a little hole appears in that part, it is improper, or, as gardeners express it, the bud has lost its root, and another must be prepared. This done, placing the back part of the bud or shield between your lips, expeditiously, with the flat haft of the knife, separate the bark of the stock on each side of the perpendicular cut, clear to the wood, for the admission of the bud, which directly slip down, close between the wood and bark to the bottom of the slit. The next operation is to cut off the top part of the shield, and protrude granulated matter between it and the wood, so as to effect a living union. The parts are now to be immediately bound round with a ligament of fresh bass, previously soaked in water to render it pliable and tough, beginning a little below the bottom of the perpendicular slit, proceeding upward, closely round every part, except just over the eye of the bud, and continue it a little above the horizontal cut, not too tight, but just sufficient to keep the whole tight, and exclude the air, sun, and wet.

" *Shield-budding reversed*, or *reversed* ⊥ *budding*, differs from the former in having the transverse cut made at the bottom of the perpendicular slit, instead of at its top, and, of course, the shield is reversed in its position. This mode is represented as preferable to the other, by such as contend that the sap rises in the bark equally with the wood; but as this opinion is now generally considered as exploded, the first, or T mode, may justly be considered as the most scientific mode of budding.

" *Scalope-budding* consists in paring a thin, tongue-shaped section of bark from the side of the stock; and in taking a similar section from the shoot of buds, in neither case removing the wood. The section or shield containing the bud is then laid on the corresponding scollop in the stock; its upper edge exactly fitted, as in shield-budding, and at least one of its edges, as in whip-grafting. After this, it is tied in the usual way. The advantages of this mode are, that it can be performed when the wood and bark do not separate freely; on trees having very stiff, thick, suberose [cork-like] barks, and at any season of the year. Its disadvantages are, that it requires longer time to perform the operation, and is less certain of success. The French gardeners often bud their roses in this manner in spring; and if they fail, they have a second chance in July, by using the common mode.

"*Budding with double ligatures* is a mode invented by Knight, and described by him (*Hort. Trans.* vol. i. p. 194) as 'a new and expeditious mode of budding.' The operations are performed in the manner first above described; but, instead of one ligature, two are applied, one above the bud inserted on the transverse section through the bark; the other, which had no further office than that of securing the bud, was applied below in the usual way. As soon as the buds had attached themselves, the lower ligature was taken off, but the others were suffered to remain. 'The passage of the sap upwards was, in consequence, much obstructed, and the inserted buds began to vegetate strongly in July, (being inserted in June;) and when these had afforded shoots about four inches long, the remaining ligatures were taken off to permit the excess of sap to pass on, and the young shoots were nailed to the wall. Being there properly exposed to the light, their young wood ripened well, and afforded blossoms in the succeeding spring; and these would,' he adds, 'no doubt have afforded fruit; but that, leaving my residence, I removed my trees,' &c.

"*Future treatment.*—In a fortnight, at furthest, after budding, such as have adhered may be known by their fresh appearance at the eye; and in three weeks, all those which have succeeded will be firmly united with the stock, and, the parts being somewhat swelled in most species, the bandage must be loosened, and, a week or two afterwards, finally removed. The shield and bud now swell in common with the other parts of the stock; and nothing more requires to be done till spring, when, just before the rising of the sap, they are to be headed down close to the bud, by an oblique cut, terminating about an eighth or a quarter of an inch above the shield. In some cases, however, as in grafting, a few inches of the stalk is left for the first season, and the young shoot tied to it for protection from the winds."—*Encyc. of Gardening.*

Mr. Abner Landrum mentions a mode of treating the stock, and recently inserted bud, somewhat different from that of Mr. Knight, as detailed above. Instead of Mr. Knight's method of using a strong ligature above the inserted bud, he adopts the following:—As soon as it can be ascertained that the bud will live, which, he says, may be in about a week, if the stock be small, let it be instantly headed down, just above the bud to be nourished. If the stock be large, amputate the principal branches; and the consequence will be, an immediate bursting of all the latent buds, together with the inoculated one. As the inoculated branches multiply, diminish the original one till nothing remains but the new tree.—*N. E. Farmer*, vol. i. p. 146.

Mr. Buel, of Albany, in a note to *A Treatise on Gardening*, written by Mr. Armstrong, says, "The modern, and, from experience, I do not hesitate to call it the best, method, is, to insert the bud *without separating the wood from it*. I have budded, the two last years, in June. If thus inserted early, and the stocks headed down when the ligatures are removed, the buds often make half a year's growth the same season, and are not so apt to suffer from the severity of the winter, as those which remain dormant."—*Mem. of N. Y. Board of Agriculture*, vol. iii. p. 17.

INSECTS.—It would far transcend our limits to give even a brief description of the various sorts of insects which injure gardens, cultivated fields, &c., and destroy the best productions of our soil. We shall, therefore, confine ourselves to stating, briefly, some of the most approved modes of counteracting the ravages, and effecting the destruction, of a few of those which are most injurious to the cultivator.

The preventive operations are those of the best culture, in the most extensive sense of the term, including what relates to choice of seed or plant, soil, situation, and climate. If these are carefully attended to, it will seldom happen, that any species of insect will effect serious and permanent injury. Vegetables, which are vigorous and thrifty, are not apt to be injured by worms, flies, bugs, &c. Fall ploughing, by exposing worms, grubs, the larvæ of bugs, beetles, &c., to the intense frosts of our winters, is very beneficial. Insects may be annoyed, and, oftentimes, their complete destruction effected, by sprinkling over them, by means of a syringe, watering-pot, or garden-engine, simple water, soap-suds, tobacco-water, decoctions of elder, especially of the dwarf kind, of walnut leaves, bitter and acrid herbs, pepper, lye of wood-ashes, or solutions of pot and pearl ashes, water impregnated with salt, tar, turpentine, &c.; or, they may be dusted with sulphur, quick-lime, and other acrid substances. Loudon says, "Saline substances, mixed with water, are injurious to most insects with tender skins, as the worm and slug; and hot water, where it can be applied without injuring vegetation, is equally, if not more powerfully, injurious. Water heated to 120 or 130 degrees will not injure plants, whose leaves are expanded, and, in some degree, hardened; and water at 200 degrees, or upwards, may be poured over leafless plants. The effects of insects may also be palliated on one species of plant, by presenting to them another, which they prefer: thus wasps are said to prefer carrots, the berries of the yew, and the honey of the hoya, to grapes; honey, or sugared water, to ripe fruit, and so on. One insect or animal may also be set to eat another, as ducks for slugs and worms, turkeys for the same purpose, and caterpillars and ants for aphides, and so on."

The Rev. Mr. Falconer, one of the correspondents of the Bath Agricultural Society, strongly recommends soap-suds, both as a manure and antidote against insects. He observes, that "This mixture of an oil and an alkali has been more generally known than adopted as a remedy against the insects which infest wall fruit-trees. It will dislodge and destroy the insects which have already formed their nests, and bred among the leaves. When used in the early part of the year, it seems to prevent the insects from settling upon them." He prefers soap-suds to lime-water, because lime soon "loses its causticity, and with that its efficacy, by exposure to air, and must, consequently, be frequently applied; and to the dredging of the leaves with the fine dust of wood-ashes and lime, because the same effect is produced by the mixture, without the same labour, and is obtained without any expense." He directs to make use of a common garden-pump for sprinkling trees with soap-suds, and says, if the water of a washing cannot be had, a quantity of pot-ash, dissolved in water, may be substituted, and that the washing of the trees with soap-suds twice a week, for three or four weeks, in the spring, will be sufficient to secure them from aphides, &c.

Other modes of counteracting the effects of insects are pointed out in treating of the plants which are most liable to be injured by them. We shall, however, make some remarks on a few of those which are most common and injurious to the interests of the cultivator.

Canker-worm.—We shall not attempt to give either a description or the natural history of the canker-worm, but refer to Professor Peck's Memoir on the subject, (which was originally published in the *Mass. Agricultural Repository* and republished in the *N. E. Farmer*, vol. v. p. 393,) and direct our attention, exclusively, to the remedies, which have been used or suggested to preserve fruit-trees from this formidable enemy.

The female of this insect comes out of the ground late in the fall, early in the spring, or, sometimes, during a period of mild open weather, in winter. Those which rise in autumn or in winter are less numerous than those which ascend in spring; but, being very prolific, they do much injury. One method of preventing the ravages of the worm is to bar the ascent of the females up the stem of the tree. This has generally been attempted by *tarring*, of which there are several modifications:—

1. A strip of linen or canvass is put round the body of the tree, before the females begin their ascent, and well smeared with tar. The insects, in attempting to pass this barrier, stick fast, and perish. But this process, to complete the desired effect, must be commenced about the first of November, and the tarring continued, when the weather is mild enough to permit the worms to emerge from the ground, till the latter end of May, or till the time of their ascent is past. It is necessary to fill the crevices in the bark with clay mortar, before the strip of linen or canvass is put on, that the insects may not pass under it. Having put on the strip, which should be at least three inches wide, draw it close, fasten the ends together strongly, then tie a thumb-rope of tow round the tree, close to the lower edge of the strip. The design of this is to prevent the tar from running down the bark of the tree, which would injure it. It should be renewed, in moderate weather, once a day, without fail. The best time is soon after sunset, because the insects are wont to pass up in the evening, and the tar will not harden so much in the night as the day.

2. Another mode of tarring is to take two pretty wide pieces of board; plane them; make semi-circular notches in each, fitting them to the stem or body of the tree; and fasten them together securely at the ends, so that the most violent storms may not displace them. The crevices betwixt the boards and the tree may be easily stopped with rags or tow; then smear the under-sides of the boards with tar. The tar, being defended from the direct rays of the sun, will hold its tenacity the longer, and, therefore, need not be frequently renewed. The trees, in this way, will be less liable to be injured by the drippings of tar, by leaving a margin of two or three inches, on those parts of the boards which are next to the trees, to which no tar is applied.

3. Another mode of blockading the paths of the insects, in their ascent up the trees, is to enclose them with collars, or circular slips of tin. Of this method we have seen some notices, but no description. We presume, however, that

the pieces of tin are shaped, and fitted to the trees, somewhat like the boards above-mentioned, and perhaps, if the outer rims of the collars were curved, or bent downwards, they might present obstacles, which the worms could not pass, even if no tar was applied. We fear that this method would prove too expensive for general adoption, but would solicit further information on this subject from those who have a practical knowledge of its application and results.

4. Another method, proposed by Dr. Jeremiah Spofford, of Bradford. Mass., is, to spread mercurial ointment (*Unguentum hydrargyri*) upon strips of woollen cloth, or narrow lists, such as are cut from the edges of broadcloth, and apply them closely round the trees, having first made the bark smooth where it is not so, that none of the grubs, or females that deposit the eggs, from which the worms are produced, may pass under the band or strip, which contains the ointment. Dr. Spofford observes that "the advantages of using the unguentum over any mode in common use are obvious. While tar requires to be renewed every night, that it may catch and hold the grub, merely by its tenacity, this mode requires preparing but once a year, and will be growing stronger for a long time, by an increased oxidation of the mercury, when exposed to the air."—See *N. E. Farmer*, vol. iv. p. 377.

The *Mass. Agr. Repos.* vol. iii. No. 4, contains some remarks on the canker-worm, by the Hon. John Lowell, president of the Mass. Agr. Soc. from which the following is extracted:—

"I had the turf dug in around sixty apple-trees, and the earth laid smooth. I then took three hogsheads of *effete*, or air-slaked lime, and strewed it an inch thick round my trees, to the extent of two or three feet from the roots, so that the whole diameter of the opening was from four to six feet.

"I tarred these trees as well as the others, and, although I had worms or grubs on most that were not limed, I did not catch a single grub where the trees were limed.

"I do not speak with confidence. I am, however, strongly encouraged to believe the remedy perfect. It was ascertained by Professor Peck, that the insect seldom descended into the ground at a greater distance than three or four feet from the trunk, and to the depth of four inches, or that the greater part come within that distance. The lime is known to be destructive of all animal substances, and I have little doubt that it actually decomposes and destroys the insect in the chrysalis state; at least I hope that this is the case.

"There are many reasons, which should encourage a repetition of this experiment. The digging round the trees is highly useful to them, while tarring is very injurious. The expense is not great. A man can dig round fifty trees in one day. The lime is a most salutary manure to the tree. After the spot has been once opened and limed, the labour of keeping it open will not be great. Three hogsheads of air-slaked lime, or the sweepings of a lime-store, will suffice for fifty trees, and will cost three dollars. As it is done but once a year, I think it cannot be half so expensive as tarring.

"I repeat it, that I mention my experiments with great diffidence, as being the first of my own knowledge. It may induce several persons to try it in different places, and where trees are surrounded with others, which are treated differently. All I pray is, that it may prove successful, and relieve us from this dreadful scourge, which defaces our country, while it impoverishes and disappoints the farmer."

The remedies proposed by Professor Peck were, 1st,—Turning up the ground carefully in October, as far as the branches of a tree extend, to half a spade's depth, or five inches, so as completely to invert the surface. A great number of chrysalids would thus be exposed to the air and sun, and of course destroyed. 2dly,—Breaking the clods, and smoothing the surface with a rake, and passing a heavy roller over it, so as to make it very hard, and without cracks. In grass-grounds, the sods should be turned with the grass-side down, and placed side by side, so as to be rolled. The winter's frosts would heave and crack a smooth surface, but it might be smoothed and hardened by the roller, or by other means, in March, with much less trouble, time, and expense, than rolling requires. As lime, when slaked, is reduced to an impalpable powder, and is thus well adapted to close the openings in the surface, Mr. P. was inclined to think its good effects are produced this way as well as by its caustic qualities.—*Thacher's Orchardist*, p. 93.

John Kenrick, Esq., of Newton, Mass., proposed, between the time in June after the worms had disappeared and the 20th of October, to take the whole of the soil surrounding the trees, to the extent at least of four feet from the trunk, and to a suitable depth, and cart it away to a distance from any trees, which the canker-worms are in the habit of feeding on; and returning an equal quantity of compost, or rich earth, intermixed with manure.

A writer for the *New England Farmer*, vol. iii. p. 327, states a case of an orchard having been preserved from canker-worms, by means of a large number of locust-trees, equal to about double the number of apple-trees.

Mr. Roland Howard, of Easton, Mass., observes, (*N. E. Farmer*, vol. iv. p. 391,) that "A quantity of lime was collected from the sweepings of a lime-store, and spread on the ground around a certain apple-tree, some time in the month of November; (the foliage of which tree had been destroyed by the canker-worm the preceding summer;) the ground being in a pulverized state, the lime was spread as far from the trunk of the tree as the drippings from the branches extended: the effect was stated to be the entire disappearance of the worm, and an increased vigour of the tree." The same writer observes, that "moving the earth with a plough or hoe late in November, or beginning of December, has been found very efficacious in destroying them." This last mentioned remedy, if it will always prove efficient, will probably be the cheapest and most expedient. But the worm must be capable of enduring a considerable degree of cold, or unerring instinct would not lead it from its dormitory in November (as it frequently does) to brave the rigours of winter on the stem or branches of the tree. We are inclined to believe, as well as to hope, that the application of lime, as above stated, will prove effectual; and, if so, it will probably be preferable to any mode of applying tar, or attacking the enemy above ground.

When the insects have ascended, their numbers may be lessened by jarring or shaking the body or limbs of the tree, causing them to suspend themselves by the threads, which they spin from their bodies, and striking them off with a stick. It is said that those which thus fall to the earth do not rise again. Whether they would be able to resist the effects of a sprinkling with soap-suds, saline or bitter infusions, &c. is more than we can say; but we wish their powers might be tested by showering them with those mixtures, which are found to be the best antidotes against other insects.

CATERPILLAR.—"This is one of the worst enemies to an orchard, when neglected; but easily destroyed by a little attention. In the spring, when the nests are small, and the insects young and tender they never venture abroad in the early part of the day, when the dew is on the trees, or in bad weather; they may then be effectually destroyed by crushing them in the nest; this attention, continued a short time every spring, will destroy those in existence, and will prevent their increase in future years: if left till grown strong, they wander from their nests, and cannot be effectually overcome without great trouble and expense."—*Coxe on Fruit Trees.*

The Hon. Timothy Pickering, in a letter to the corresponding secretary of the Massachusetts Agricultural Society, has recommended an implement for the destruction of caterpillars. It is made by inserting some hog's bristles between twisted wires, in such manner as to form a cylindrical brush, which will present bristles on every side. This is attached to a pole of such length as the trees may require, and the caterpillars are brought down by it, and then crushed. Other methods have been proposed, such as casting over the tree a few handfuls of ashes, in the morning before the dew is dissipated from the foliage, or after a shower of rain. A strong whitewash of fresh stone-lime, applied by the means of a mop, or sponge fixed to the end of a pole, strong soap-suds, spirits of turpentine, a little oil of any kind, particularly blubber oil, are likewise fatal to the insects. But, perhaps, the most effectual remedy is the *hand*, by which the insects may easily be removed at an early stage; but if this be neglected, it is thought that the next best remedy is the use of Col. Pickering's brush as above. In applying either of these remedies, care must be taken to choose that part of the day, when the caterpillars are in their nests. They rarely quit them till nine o'clock, and generally return to them again about twelve.

CURCULIO.—This is a small bug, or beetle, which perforates the young fruit of the pear, apple, and all stone fruits, and deposits its eggs in them. The eggs soon hatch, and a small maggot is produced, which feeds either on the pulp of the fruit, or on the kernel of the seed; for the tastes and habits of the different species are not similar. In the stone fruits, this injury destroys their growth, and they fall with their little enemy within them. The insect retreats into the earth, and passes the winter in the chrysalis state, and comes forth just as the young fruit is forming, or the petals of the flowers are falling, to renew its mischievous labours. This insect continues its depredations from the first of May until autumn. Dr. James Tilton, of Wilmington, Delaware, in an article on this subject, published in the American editions of *Willich's Domestic Encyclopedia*, observes that "Our fruits, collectively estimated, must thereby be depreciated more than half their value;" and adds, in his directions for destroying the insect, "All the domestic animals, if well directed, contribute to this purpose. Hogs, in a special manner, are qualified for the work of extermination. In large orchards, care should be taken that the stock of hogs is sufficient to eat up all the early fruit which falls from May till August. This precaution will be more especially necessary in large peach orchards; for, otherwise, when the hogs become cloyed with the pulp of the peach, they will let it fall out of their mouths, and content themselves with the kernel, which they like better; and thus the curculio, escaping from their jaws, may hide under ground till next spring."

"The ordinary fowls of a farm-yard are great devourers of beetles. Poultry, in general, are regarded as carnivorous in the summer, and therefore cooped some time before they are eaten. Every body knows with what avidity ducks seize on the tumble-bug, (*Scarabæus carnifex*,) and it is probable the curculio is regarded, by all fowls, as an equally delicious morsel. Therefore it is that the smooth stone fruits, particularly, succeed much better in lanes and yards, where poultry run without restraint, than in gardens and other enclosures, where fowls are excluded."

Instead of turning swine into orchards, to pick up the fruit which falls, and thus destroy the worms which it contains, it will often be found most expedient to gather such fruit, and give it to swine in pens, &c., either raw, or, what would be better, boiled. If such measures were generally taken, with fruit which falls spontaneously, as to prevent the insects, which generally cause it to drop prematurely, from escaping into the ground, the worms, which destroy one half our fruit, and very much deteriorate a considerable part of the other half, would soon be extirpated from our orchards and fruit-gardens.

APHIS, PLANT-LOUSE, PUCERON, *or* VINE-FRETTER.—"This genus of insects comprises many species and varieties, which are denominated from the plants they infest. The males are winged, and the females without wings: they are viviparous, producing their young alive, in the spring; and also oviparous, laying eggs in autumn. Water, dashed with force from a syringe, [or garden engine,] will prove as destructive to them as any thing, when on trees; and smaller plants may be washed with lime-water, with tobacco-water, with elder leaves infused in water, or with common soap-suds, any of which will destroy the insects."—*Loudon.* "Tie up some flour of sulphur in a piece of muslin, or fine linen, and with this the leaves of young shoots or plants should be dusted, or it may be thrown on them by means of a common swan's-down puff, or even a dredging box. Sulphur has also been found to promote the health of plants, on which it was sprinkled, and that peach trees, in particular, were remarkably improved by it."—*Dom. Encyc.* "In green-houses they are readily destroyed by the smoke of tobacco, or of sulphur. But in the open air, fumigation, though much in vogue many years since, is of no avail. The best remedy is the simplest. Soap-suds, forcibly applied, will, after one or two applications, effectually destroy them, without apparent injury to the plant."—*Deane.*

A writer for the *New England Farmer*, vol. iii. p. 9, after stating a number of experiments with soap-suds, for destroying aphides, which were unsuccessful, or but partially succeeded, says, "I was led to conclude, that it is not sufficient to wet the upper side of the leaves, thinking to make them disagreeable or poisonous to the insect, but that they must be well drenched or immersed in the suds. I therefore applied again the same remedy; but with this difference,—instead of sprinkling the upper side of the branches, I carried a pailful of suds from tree to tree, and, bending the tops of small trees, and the branches of larger ones, immersed all the parts infested with lice, holding them in the liquor for a moment, that none might escape being well wet. On examining the trees the next day, the greater part of the lice were destroyed. It was found necessary to repeat the same process once or twice, with suds not too weak, say about two or three ounces of soap to a gallon of water." Another writer in the same paper, p. 10, says, "I have applied soap-suds to my apple-trees, in order to kill the lice. It will be sufficient for me to say, that just sprinkling them with suds will not kill them; neither will dipping the branches, which are infested with them, kill them. But dipping and holding them in as long as I can conveniently hold my breath, will destroy every one. The suds do not appear to injure the leaves. I tried suds made on purpose, and suds which had been used for family washing. The latter answers the purpose much the best." It is possible to make soap-suds so strong as to kill the tender branches, as well as the insects which infest them.

The proportion above-mentioned, of two or three ounces of soap to a gallon of water, is, probably, most advisable.

Cut-worm.—This is an ash-coloured worm, with a stripe almost black on its back. When fully grown it is about the size of a goose-quill, and about an inch and a quarter in length. They are very apt to cut off young cabbages, cauliflowers, beets, &c. They never voluntarily appear on the surface of the ground in the day time, but may be found about an inch below it. In the night they make their excursions, cut off the stems of young plants just at the top of the ground, and again bury themselves.

Dr. Deane observed, "I once prevented their depredations in my garden, by manuring the soil with sea-mud, newly taken from the flats. The plants generally escaped, though every one was cut off in a spot of ground that lies contiguous. From the success of this experiment, I conclude that salt is very offensive or pernicious to them. Lime and ashes, in some measure, prevent their doing mischief; but sea-water, salt, or brine, would be more effectual antidotes. The most effectual, and not a laborious remedy, even in field-culture, is to go round every morning, and open the earth at the foot of the plant, and you will never fail to find the worm at the root, within four inches. Kill him, and you will save not only the other plants of your field, but, probably, many thousands in future years."

There is some danger in making use of salt, brine, or sea-water, of injuring the plants in attempting to destroy insects; and we should, therefore, generally prefer decoctions of elder, walnut leaves, or tobacco. Mr. Preston, of Stockport, Penn., preserved his cabbage-plants from cut-worms, by wrapping a hickory-leaf round the stem, between the roots and leaves.—*N. E. Farmer*, vol. iii. p. 369. The Hon. Mr. Fiske, of Worcester, Mass., in speaking of this insect, says, "To search out the spoiler, and kill him, is the very best course; but, as his existence is not known except by his ravages, I make a fortress, for my plants, with paper, winding it conically and firmly above the root, and securing it by a low embankment of earth."—*N. E. Farmer*, vol. iv. p. 362.

Lice on apple-trees.—There is a species of insect infesting apple-trees, which may be styled the *bark-louse*, to distinguish it from the *plant-louse*, or *aphis*. It is, in form, like half a kernel of rye, but much smaller, with the flat side sticking to the bark of the tree. Jesse Buel, Esq., of Albany, gives the following statement of his mode of destroying them:—"In June last, I observed directions in the *New England Farmer* for destroying the parasitic enemy; and, that being the particular time to make the application, I immediately set about it. For this purpose, I took eight parts of water and two of soft soap, and mixed with these lime enough to make a thick whitewash. With a whitewash and paint brush, I put this upon the trunks and limbs of trees, as high as was practicable, filling the cracks in the bark, and covering the whole surface. The effect has been not only to destroy most of the lice, but to give the trees an improved and vigorous appearance. The outer bark, which, from a stinted growth, had become rough and hard, has, in a measure, fallen off in flakes, and disclosed a soft, smooth bark, the sure indication of health."

E. Perley, Esq. published a description of this insect in the *Mass. Agr. Repos.* vol. iii. p. 114, and says, "The application which I have found most effectual is, washing the trees with lie or brine." He observes, that "they resemble blisters, and are near the colour of the bark of the tree. These blisters contain from ten to thirty nits or eggs each, in form like a snake's egg; which, in a common season, begin to hatch about the 25th of May, and finish about the 10th of June. These nits produce a white animalcule, resembling a louse, so small, that they are hardly perceptible by the naked eye; which, immediately after they are hatched, open a passage at the *end* of the blister, and crawl out on the bark of the tree, and there remain, with little motion, about ten days, when they stick themselves fast to the bark of the tree, and die. From this little carcass arises a small speck of *blue mould*, which is most plain to be seen between the 10th and 20th of June, and continues about fifteen days, and then gradually wears off until the old carcass appears, which, by this time, is formed into a new blister, and contains the spawns or nits beforementioned. These blisters prevent the circulation of the sap, and prove as fatal to the tree as the canker-worm."

"A correspondent of the Caledonian Horticultural Society recommends *clay paint* for the destruction of insects, and the mildew on fruit-trees. The instructions are, that you take a quantity of the most tenacious brown clay that can be obtained; diffuse among it as much soft water as will bring it to the consistence of cream or paint; pass it through a fine sieve, so that it may be made perfectly smooth and unctuous, and freed from any gritty particles. With a painter's brush, dipped in the clay paint, go carefully over the whole tree, not excepting the young shoots. This layer, when it becomes dry, forms a hard crust, which, enveloping the insects closely, completely destroys them, without doing the smallest injury either to the bark or buds."—*Thacher's Orchardist.* Solutions of potash and decoctions of tobacco are likewise recommended.

Apple-tree borer.—*Saperda bivitata.*—The scientific description of this very pernicious insect is thus given by Professor Say, of Philadelphia:—"Hoary; above, light-brown, with two broad, white fillets. Inhabits the United States. *Body*, white; *eyes*, fuscous; a small spot on the vertex, and another behind each eye, light-brown; *antennæ*, moderate, slightly tinged with bluish; *thorax*, light-brown, with two broad, white lines, approaching before; *elytra*, light brown, irregularly punctured; a broad, white, longitudinal line on each, nearer to the suture than to the outer edge. Length, from one half to seven tenths of an inch. A very pretty insect. In the larvæ state, it is very injurious to the apple-tree, boring into the wood."—*Journal of the Academy of Sciences, Phil.* vol. iii. p. 409.

Professor Say, in a letter to Jesse Buel, Esq., says, "You state, that it leaves the pupa, and becomes perfect in the latter part of April, and that the eggs are deposited beneath the surface of the soil. These two circumstances ascertained, I would recommend the application, early in May, or the latter part of April, of common bricklayer's mortar, around the base of the tree, so as to cover completely the part, and its immediate vicinity, where the deposit is made. This preventive was successfully employed by Mr. Shotwell, against the attacks of the peach-tree insect, (see *American Farmer*, vol. vi. p. 14,) and I see no reason why it should not be equally efficacious in the preservation of the apple-tree."—*Mem. of N. Y. Board of Agriculture*, vol. iii. p. 479.

The *Mass. Agr. Repos.* vol. v. p. 360, contains a paper on this insect, by John Prince, Esq., by which it appears that worms of this kind are got rid of by "digging round the tree, and clearing away the earth to the roots, and then, with a sharp-pointed knife, a chisel, or a gouge, (and a small wire to probe, if they are deep in the tree,) they may easily be destroyed." After taking out the worms, the wounds should be covered over with grafting-clay and a large proportion of dry wood-ashes mixed, and the earth then returned to the tree. The process for cleansing the trees from borers should be performed in the spring, as soon as the frost is out of the ground, or at least before the month of June, as the perfect insect escapes before that time.

SLUG-WORM, *or* NAKED SNAIL.—These reptiles appear on the leaves of fruit-trees in the month of July. Professor Peck has ascertained that they are the progeny of a small black fly, which deposits its eggs in the leaf in the months of May and June. They may be destroyed by means of lime, sprinkled over the leaves in the form of powder. For this purpose, a wooden box, of convenient size, having its bottom perforated with numerous small holes, is to be filled with lime. This, being mounted on a pole, and shaken over the tree, distributes the lime among the leaves, and the slugs are immediately destroyed. The labour is very trivial; a man may cover a large tree in three or four minutes; and the desired effect is certain. Fine earth, shaken through a basket or perforated box, will answer as well.

"Another remedy, it is said, will prove equally effectual. It is a strong infusion of tar, made by pouring water on tar, and suffering it to stand two or three days, when it becomes strongly impregnated. This, if sprinkled over the leaves by means of an engine, will kill these vermin instantaneously. A strong decoction of tobacco will probably produce the desired effect, and tanners' bark, put round the tree, it is said, will have a salutary tendency as a preventive."—*Thacher's Orchardist.*

Forsyth recommends watering the ground, where these insects are, with soap-suds and urine, mixed with tobacco-water. Ducks, admitted into a garden, will destroy all within their reach.

WIRE-WORM, *or* RED-WORM.—This insect is slender, and usually about an inch long, with a hard coat, and a pointed head. Mr. William Moody, of Saco, (Maine,) in a communication to Hon. Josiah Quincy, published in *Mass. Agr. Repos.* vol. iv. p. 353, observes, "I am persuaded, from experience, that sea-sand, put under corn or potatoes with manure, or spread on the land, will go far, if not wholly, to the total destruction of these destructive worms, on which nothing else seems to have any effect. It has a beneficial effect spread on land before ploughing, or even after land is planted with corn or potatoes, not only to destroy the wire-worm and other insects, but to increase the crop. With my neighbours a load of sea-sand is considered as preferable to a load of the best manure, to mix in with their common barn-manure, or to spread on their gardens and low flat land."

Probably sea-mud or sea-water would produce good effects as preservatives against this and other insects.

A correspondent of the *New England Farmer*, vol. iv. p. 284, recommends, from actual experiment, the soaking of seed-corn in a solution of copperas, to preserve it against the wire-worm, other insects, and birds. He says, "The plan which I pursued was as follows:—I used about one and a half pound of copperas in three pecks of corn. I made the water warm, and soaked the corn full forty-eight hours before planting, putting in corn and copperas as we used it out. It is not easy to use too much copperas; I believe the more the better." This method has been frequently and successfully put in practice. See *N. E. Farmer*, vol. v. p. 310.

The STRIPED BUG, *or* YELLOW FLY.—This is a small insect of the *coleoptera* order, or such as have *crustaceous elytra*, or wing cases, like the beetle. The elytra of this bug are striped with yellow and black. They prey on the young plants of cucumbers, melons, squashes, and others of the *cucurbitaceæ* species. "These insects may be considerably thinned by killing them in a dewy morning, when they have not the free use of their wings, and cannot well escape. But nothing that I have tried has proved so effectual as sifting or sprinkling powdered soot upon the plants when the morning dew remains on them. This forms a bitter covering for the plants, which the bugs cannot endure the taste of."—*Deane.* "We would recommend sprinkling the plants with a little sulphur or Scotch snuff." —*Farmer's Assistant.* But the surest defence against these insects is, enclosing the plants with a frame, and a muslin or gauze covering, as recommended page 91.

JERUSALEM ARTICHOKE.—*Helianthus tuberosus.* —The Jerusalem artichoke is a hardy perennial, a native of Brazil, and is of the same genus as the sun-flower. It is propagated and cultivated like the potato. We have been informed that this root will grow and produce a profitable crop on poor land, and *without manure;* though, with deep ploughing and good manuring, its culture would probably be attended with greater profit. It was much esteemed before potatoes were known. The epithet *Jerusalem* is a corruption of the Italian word *Girasole* (from *girare*, to turn, and *sol*) or sun-flower; the name *arti-*

choke is bestowed from the resemblance in flavour which the roots have to the bottoms of artichokes. It is superior to the potato in being more hardy, and not liable to be injured by frost; but we believe it contains somewhat less nutritive matter. Its tops are large, and may make a valuable addition to the farm-yard, of a substance which may be converted into manure. From the circumstances of its flourishing in a poor soil, and producing large leaves and stalks, there can be no doubt that it derives much food for plants from the atmosphere, which by its decay is imparted to the soil on which it grows, or on which, after rotting, it is spread as manure. There is no plant which more completely shades the ground, and it must in that way enrich it. It will flourish in the shade of trees, buildings, &c. where other plants will not thrive. We believe there are thousands of acres of land in the more populous parts of the United States, which are now considered as not worth cultivation, which would produce considerable quantities of the Jerusalem artichoke, with no other trouble than *once* planting, and digging the roots from time to time as they are wanted.

Dr. Darwin says that the Jerusalem artichoke will not ripen its seeds in Great Britain, (and we do not believe it will in New England,) by being suffered to grow in the open air under ordinary cultivation. But by forcing the plant in pots, hot-houses, &c., perhaps seeds might be obtained. This would, probably, be desirable, for it is supposed that all plants degenerate if propagated merely by slips, roots, cuttings, &c., without having recourse to seeds. Potatoes should be renewed from the seed, at least once in twelve or fourteen years, or they will degenerate; and probably Jerusalem artichokes might become more valuable by the same means. Planting large and fair roots, with suitable soil and culture, will retard this degeneracy, but, we believe, not wholly prevent it.

"*Use.*—The roots are esteemed a wholesome, nutritious food, and are eaten boiled, mashed with butter, or baked in pies, and have an excellent flavour. Planted in rows from east to west, the upright herb of the plant affords a salutary shade to such culinary vegetables as require it in the mid-summer months, as lettuce, turnips, strawberries, &c."—*Loudon.*

The second volume of *Memoirs of the New York Board of Agriculture* contains remarks on this root by Levi McKean, of Dutchess, in which he gives it as his opinion that artichokes are the best suited for cultivation in this climate as a crop for hogs, sheep, and dairies, of any article that we have yet tried; and, besides the use of this crop for stock, which many writers consider to be equal to potatoes, they are also recommended highly as an article of human diet. It is true that, when boiled, they do not possess that peculiar farinaceous quality, that is so much esteemed in the best sorts of potatoes; but it is said that, when roasted, they are a very delicate article for the table, their taste then resembling the ground-nut of this country.

The only objection we have heard stated to this vegetable as an article of field-culture is, that, when once suffered to enter, it will take exclusive possession of a soil; and thus, when a change of crops is desired, becomes a most troublesome weed. But by turning in a sufficient number of hogs, the artichokes may be entirely eradicated; and, probably, a poor soil, which would answer no other purpose of culture, might be planted with the Jerusalem artichoke, and converted into a permanent pasture for swine. If not overstocked with the animals, the plants would keep possession of the soil, which they would meliorate; and when it should be wished to change the crop, turn in hogs enough to root out the artichokes.

LANDSCAPES *and* PICTURESQUE GARDENS.—The following article was written expressly for this work, by Mr. A. Parmentier, of New York, a French horticulturist of much taste and science:—

It has been reserved for the good taste of our age to make many advantageous changes in the embellishment of gardens, and to reinstate Nature in the possession of those rights from which she has too long been banished by an undue regard to symmetry.

Our ancestors gave to every part of a garden all the exactness of *geometric* forms: they seem to have known of no other way to plant trees, except in straight lines; a system totally ruinous to the beauty of the prospect. We now see how ridiculous it was, except in the public gardens of the city, to apply the rules of architecture to the embellishment of gardens.

The majestic trunk is now allowed the liberty of displaying its form, or of following in its vigorous shoots the plan of nature. Gardens are now treated like landscapes, the charms of which are not to be improved by any rules of art.

The advantages of these changes are so manifest, and so well appreciated, that further proofs seem unnecessary. For where can we find an individual, sensible to the beauties and charms of nature, who would prefer a *symmetric* garden to one in modern taste; who would not prefer to walk in a plantation irregular and picturesque, rather than in those straight and monotonous alleys, bordered with mournful box, the resort of noxious insects?

Where is the person, gifted with any taste, who would not choose those alleys that wind without constraint, in preference to those dull straight lines which can be measured by one glance of the eye, and the monotony of which is unvaried? Instead of this, the modern style presents to you a constant change of scene, perfectly in accordance with the desires of a man who loves, as he continues his walk, to have new objects laid open to his view To understand this style of a garden requires a quick perception of the beauties of a landscape, without which the existing plantation might be destroyed, instead of being used. Limited prospects, and neighbouring houses and buildings not worthy of notice, should be concealed, and the view left open to those objects which strike the eye of the beholder agreeably. The front of the house ought always to be *uncovered*, the principal point of view seen, or conjectured. A vast idea of the proprietor should be given, and this can only be done by a grand plan, in which nothing niggardly is to be seen.

Rows of trees should never be planted in front of the house, particularly when the house has been built in good taste, and at great expense. It may be objected to this, that the shade is wanted, and this I would not exclude; but, instead of one row in front, I would plant thick groups of trees on the three other sides, and leave the front open to public view; otherwise the taste and expense are, in a great measure, thrown away.

When you choose the situation of a country-house, let it be at some distance from the public road, so that the road which leads to it may give a good idea of the extent of the proprietor's domains, and care should be taken that the road is proportioned to this extent. It ought to be from eight to ten feet wide, so that carriages may pass, and gently serpentine. This winding should have a reason—that is to say—some groups of trees should be so placed as to appear to be the cause of it: for naturally the road would have led directly to the house, but the person walking, when he observes these groups of trees, will see at once why it does not. Besides, he will be agreeably amused by the variety of views which will show to advantage the manner in which the artist has executed his plan, and the choice he has made of a situation.

If the house is placed on an eminence or side-hill, the prospect will be much more beautiful if you can enjoy the view of water: and, to add to the whole effect, and facilitate the labours of the artist, it is desirable that a grass-plot should naturally present itself.

The plantations and groups of trees near the house should be, if possible, of a deeper green;—they would extend the view and the perspective, and produce the effect of shades in a landscape-picture, where the groups of trees in front are of a darker shade, and seem to remove the perspective from the extremity of the landscape. For the same reason, the trees at the farther part of a park, or garden, should be those of a thin and light foliage.

Plantations should consist of, besides merely ornamental trees, those fruit-trees which are high and of bright foliage. Their flowers in spring, and branches loaded with fruit in autumn, make them objects of great beauty and interest.

The apple-tree alone, on account of its horizontal branches, should be confined to the orchard, where its useful products are ornamental and valuable. The most should be made of the agreeable and interesting views which may be had in the neighbouring landscape. They may be made useful to the general plan by being represented as the property of the proprietor.

For this reason, I highly approve of blind fences, and live hedges. But fences, necessary as enclosures, should be concealed so as not to appear as boundaries to the establishment, and present to the eye a disagreeable interruption in the prospect. The judicious use of hermitages, arbours, cottages and rotundas will add to the effect, in picturesque gardens and ornamented farms. If you use these ornaments, place the hermitage in some retired spot: a small rivulet would be an appropriate and beautiful accompaniment. The rustic arbour and cottage may occupy a place less secluded. An elegant rotunda should be seen from a distance, and on a hill or eminence. It should make a part of the establishment of a wealthy man, as well as pagodas, turrets, and Chinese towers. These ornaments are so expensive, that they are beyond the means of most persons: but hermitages, arbours and cottages may generally be afforded, as there is little expense in their construction.

Rustic bridges are very pretty where there is a stream, and they can be made of use; but they have no pretensions as mere accompaniments to a plantation. Obelisks, columns, &c. should be placed on elevated places.

As to tombs and cemeteries, I should wish to banish them entirely from gardens. They always awaken melancholy reflections in old people, for they remind them of their approaching end; and a regard for their feelings should, I think, exclude from their places of resort every object which could have such an effect.

Whilst on this subject, I will mention an anecdote of the celebrated Kent, architect of the English gardens, which will show to what extent this mania may be carried. He built a tomb in a park, and, to make the place still more gloomy, planted around it dead and mutilated trees; but notwithstanding the celebrity he had acquired, he was loaded with ridicule, and forced to displace the trees.

LAVENDER.—*Lavandula spica.*—The lavender is a hardy under shrub, a native of the south of Europe. The plant rises two to four feet in height, with hoary, linear leaves, slightly rolled back at the edges: the flowers form terminating spikes of a blue colour, and appear from July to September. The leaves and flowers are powerfully aromatic.

"*Propagation and culture.*—It is propagated by cuttings and slips, like rosemary; it likes a dry soil, and may be planted either in distinct plants, two feet asunder, or to form a sort of hedge row, in one or more lines, especially where large supplies of flowers are required for distilling. The plants will advance in a close, branchy growth, from a foot and a half to two feet high, or more; and, when established, will produce plenty of flowers in July and August. Gather them while in perfection, cutting the spikes off close to the stem. Then give the plants occasional trimming, cutting off the gross and rampant shoots of the year, and the decayed flower-spikes." Neill observes, "If lavender be planted in a dry, gravelly, or poor soil, its flowers have a powerful odour, and the severity of our winters has little effect on it; while, in a rich garden soil, though it grows strongly, it is apt to be killed, and the flowers have less perfume."

"*Use.*—It is rather a medicinal plant than one used in cookery; though a few plants are kept in every garden. Imitation scent-bottles are made, by the ladies, of its fragrant spikes. They are also put in paper bags, and placed among linen to perfume it Lavender-water, a well-known perfume, is distilled from the flowers; for which purpose the plant is extensively cultivated in different places."—*Loudon.*

LAYERS.—Layers, in horticulture, denote certain tender shoots or sprigs of trees, which are buried in the ground till they have taken root, when they are separated from the parent stock, and become distinct plants. The operation of layering should be commenced before the ascent of the sap, or delayed till the sap is fully up, to wit, early in spring, or in mid-summer. The shoot intended to become a new plant, is half separated from the parent plant, at a few inches from its extremity. If the cut or notch does not penetrate at least half way through, some sorts of trees will not form a nucleus the first season; on the other hand, if the notch be cut nearly through the shoot, a sufficiency of alburnum, or sap-wood, is not left for the ascent of the sap, and the shoot dies. In delicate sorts, it is not sufficient to cut a notch merely, because, in that case, the descending sap, instead of throwing out granulated matter, in the upper side of the wound, would descend by the entire side of the shoot; therefore, besides a notch formed by cutting out a portion of bark and wood, the notched side is slit up at least one inch, separating it by a bit of twig, or small splinter of stone or potsherd.

Mr. Armstrong says, (*Mem. of N. Y. Board of Agr.* vol. iii. p. 15,) "This mode was probably suggested by observing the habits peculiar to some trees and shrubs, (as the laurel and the currant,) of pointing their branches to the earth; where, finding an habitual moisture, they strike root, and become distinct plants. In imitating this natural process, the artist notches the lower side of the branch, buries this in the earth, three or four inches deep, and keeps it down by a wooden crotchet. As this is done before the descent of the sap, the notch operates like a dam or obstruction to the descending juices, and forces them into a bulbous form, and granular substance, whence are emitted a mass of roots, necessary to the infant plant. When these are sufficiently formed, that part of the branch which binds them to the stem is severed, and the layer taken up and transplanted." For further particulars respecting the manipulation, &c., in this mode of propagation, see *Encyc. of Gardening*, pp. 388, 389.

LEAVES.—The leaves of trees, particularly of oak, may be employed advantageously to form hot-beds. Speechly, an eminent English gardener, gives the following account of his mode of using them —

"After being raked into heaps, they should immediately be carried to some place near the hot-house, where they must lie to couch. I generally fence them round with charcoal hurdles, or any thing else, to keep them from being blown about the garden in windy weather. In this place we tread them well, and water them, in case they happen to have been brought in dry. We make the heap six or seven feet in thickness, covering it over with old mats, or any thing else, to prevent the upper leaves from being blown away. In a few days the heap will come to a strong heat. For the first year or two that I used these leaves, I did not continue them in the heap longer than ten days or a fortnight; but in this I discovered a considerable inconvenience, as they settled so much, when got into the hot-house, as soon to require a supply. Taught by experience, I now let them remain in the heap for five or six weeks, by which time they are properly prepared for the hot-house. In getting them into the pine pits, if they appear dry, we water them again, treading them in layers exceedingly well, till the pits are quite full. We then cover the whole with tan, to the thickness of two inches, and tread it well, till the surface becomes smooth and even. On this we place the pine pots, in the manner they are to stand, beginning with the middle row first, and filling up the spaces between the pots with tan. In like manner we proceed to the next row, till the whole is finished; and this operation is performed in the same manner as when tan only is used.

"Thus prepared, they will continue a constant and regular heat for twelve months, without either stirring or turning; and, if I may form a judgment from their appearance when taken out, (being always entire and perfect,) it is probable they would continue their heat through a second year." After some further details, the same writer observes, "I believe that oak leaves are preferable to those of any other sort; but I have found, by repeated trials, that the leaves of beech, Spanish chestnut, and hornbeam, will answer the purpose very well. It seems that all leaves of a hard and firm texture are very proper; but soft leaves, that soon decay, such as lime, sycamore, ash, and those of fruit-trees in general, are very unfit for this mode of practice."

The superiority of oak leaves as a material for hot-beds, according to this writer, consists in the following particulars:—"They always heat regularly; for, during the whole time that I have used them, which is near twenty-five years, I never once knew their heating with violence."

"The heat of oak leaves is constant; whereas tanners' bark generally turns cold in a very short time, after its furious heat is gone off." "There is a saving in point of expense, and decayed leaves make good manure; whereas, rotten tan is experimentally found to be of no value."

"Leaves mixed with dung," says Loudon, "make excellent hot-beds; and beds compounded in this manner preserve their heat much longer than when made entirely with dung. In both cases, the application of leaves will be a considerable saving of dung," &c.

LEEK.—*Allium porrum.*—The leek is a hardy biennial, a native of Switzerland. The stem rises three feet, and is leafy at bottom; the leaves an inch wide.

The *varieties* are,

The narrow-leaved, or Flanders leek;
The Scotch, or flag, or Musselburgh leek;
The broad-leaved, or tall, London leek.

Propagation.—"From seed; and, for a bed four feet wide by eight in length, one ounce is requisite."

Soil and site.—"The soil should be light and rich, lying on a dry sub-soil. A rank soil does not suit it, so that, when manure is necessary, well reduced dung, mixed with road drift, is better than dung alone. The situation should be open. Let the ground be dug in the previous autumn, ready for sowing in the spring. For the principal crop allot beds four or five feet wide, and sow in drills, about sixteen inches apart. A small crop may be sown thinly with a main crop of onions, and when the latter are drawn off, the leeks will have room for full growth."

Times of sowing.—"A small first crop may be sown as soon as the ground is dry enough, and the weather sufficiently mild in the spring. The principal crop should be sown the last of April or the beginning of May."

Course of culture.—"When the plants are three or four inches high, weed them clean, and thin them where too much crowded. Water well in dry, hot weather. The leek is much improved in size by transplanting; and those designed for that purpose will be fit to remove when from six to ten inches high. For this purpose, take out a quantity, regularly, from the seed-bed, either in showery weather, or after watering the ground. Trim the long, weak tops of the leaves, and the roots and fibres, and plant them by dibble, in rows, from nine to twelve inches asunder, by six or eight inches in the row, inserting them nearly down to the leaves, or with the neck part mostly into the ground, to whiten it a proportionate length. Press the earth to the fibres with the dibber, but leave the stem as loose as possible, and, as it were, standing in the centre of a hollow cylinder. Give water if the weather be dry. Those remaining in the seed-bed thin to six or eight inches distance. Keep the whole clear from weeds. In hoeing, loosen the ground about the plants, to promote their free, vigorous growth. Some plant in hollow drills, and earth up, as in celery culture, which produces very large stems."

To save seed.—"Transplant some best, full plants, early in the spring, in a sunny situation, or in a row near a south fence. They will shoot in summer, in single, tall seed-stalks. Support them, as necessary, with stakes; and they will produce ripe seed in September. Cut the ripe heads with part of the stalk to each; tie two or three together, and hang up under cover, to dry and harden the seed thoroughly, when it may be rubbed out, cleaned, and put by for future service."—*Abercrombie.*

Use.—"The whole plant is used in soups and stews; but the blanched stem is most esteemed. Leeks formerly constituted an ingredient in the dish called *porridge*, which some suppose to be derived from the Latin *porrum*."—*Loudon.*

"The leaves of this plant possess a flavour similar to that of onions; affording a constant dish at the table of the Egyptians, who chop them up small, and eat them with their meat. They are also in great esteem among the Welsh; and their general utility, as a wholesome pot-herb, renders them a valuable culinary spice."—*Willich.*

LETTUCE.—*Lactuca sativa.*—Lettuce is a hardy, annual plant, introduced or cultivated in England in 1562, but from what quarter is not known.

Varieties.—These are very numerous; and, from their names, many of them appear to have come originally from the Greek Islands, and the coast of the Levant. Those mentioned in Mr. Russell's Catalogue are,

Early curled Silesia,
Large green-head, or cabbage,
Royal cape, (*superior quality*,)
India Lettuce, (*fine*,)
Imperial cabbage,
Hardy green,
Brown Dutch cabbage,
Grand admiral, (*large, fine cabbage*,)
Tennis-ball, or rose,
Magnum bonum Cos,
Brighton Cos,
Ice Cos,
White Cos, or loaf,
Green Cos.

Estimate of sorts.—The cabbage lettuces are round-leaved, growing in a compact, full head, of squat form, close to the ground. All the Cos lettuces, in their general growth, are more or less upright, of an oblong shape. Both kinds have white, close, firm heads, when in perfection; the varieties reach maturity from June till September. Meanwhile, they are occasionally used in young, open growth. In a very young state, the cabbage-lettuces have a milder, more agreeable taste than the Cos; but when both classes are full grown, the flavour of the Cos is preferred for salads, while the cabbage kinds are more used for soups.

Propagation.—From seed, of which, for a seed-bed four feet wide by ten feet in length, a quarter of an ounce is sufficient, and will produce upwards of four hundred plants.

Soil and situation.—"All the sorts grow freely on any rich, mellow soil, where the sub-soil is dry. For the most part, raise this vegetable as a principal crop, on beds set apart for it, and keep the varieties separate; but to multiply the supplies throughout summer, portions may be sown, thinly intermixed with principal crops of leeks, onions, carrots, and spinnage, which will come off before the lettuces are full grown; also with any young perennials, which stand at wide intervals."

Times of sowing.—To obtain a constant supply of good lettuce, it is serviceable to sow every month, from February (or the opening of spring) to July, for the main summer and autumn crops. For late autumn crops, you may sow in August, and if you have hot-beds, frames, &c. you may sow in September, and so on, through the fall and winter. Early spring lettuce may be sowed so late in the fall as not to come up till spring.

Process of sowing.—Abercrombie says, "The ground should have been broken in the previous digging. Sow broad-cast, moderately thin; rake in lightly, and very even." Others direct to sow in drills, from a foot to sixteen inches apart. Armstrong observes, that "the straight-leafed sort is best cultivated in broad-cast, and does not require transplanting; but that the curled and head-lettuce cannot succeed without it."

Management of the summer crop.—"In the successive crops, raised from the opening of spring till the close of summer, when the plants reach about two, three, or four inches' growth, they should be thinned; of those removed, let a requisite number be planted out, from a foot to fifteen inches asunder, to remain for cabbaging. Such as continue in the seed-beds may be either gathered thinningly, in progressive stages, till the final reserve advance in close-heading; or, as they increase in size, be planted out at the square distance mentioned above, especially those designed to stand till of stocky growth. In dry weather, water well at transplanting; also weed and hoe the beds thinned, and water them, if necessary. In the first heading-crop of Cos lettuces, when about three parts grown, and beginning to close the inner leaves, a number may be forwarded in cabbaging, by tying the leaves together, moderately close, with strings of bass; the remainder will head and whiten in due time, without this assistance.

Crop raised on heat.—"For an accelerated crop, some may be sown in the beginning or middle of February, on a gentle hot-bed. When the plants are one or two inches high, in March or April, prick a portion either into a warm border, if a mild season, and let them be shielded with mats, during nights and bad weather; or into a frame or slender hot-bed, to bring them more forward. According to their progress in April or May, transplant them into the open garden, from six to twelve inches asunder, to remain for heading."

To save seed.—"Leave or transplant either some of the early winter-standing plants, in March or April, or of the forwardest spring-sown crops, in May, or the beginning of June, fifteen inches asunder. They will produce ripe seed in August or September."—*Abercrombie.*

Use.—The use of lettuce, as a cooling and agreeable salad, is well known; it is also a useful ingredient in soups. It has medical properties, similar to those of opium. The refuse leaves are said to be good food for geese, ducks, and swine.

LOCUST-TREE.—*Robinia pseudo-acacia.*—This tree is a native of the United States.

Method of cultivation.—"It is capable of being raised from the seed, cuttings, layers and suckers; but the seed method is said to afford the best plants. The seeds should be sown about the end of March, or beginning of the following month, on a bed of light mould, being covered to the depth of about half an inch. The plants usually appear in the course of six or eight weeks. They should be well weeded and watered, and, when sufficiently strong, should be set out in the spring, or autumn, in nursery rows, for two or three years, in order to remain to have a proper growth for final planting."—*Rees' Cyclopedia.*

Dr. Drown, of Rhode Island, says, that "The easiest method of raising the locust is as follows:—Plant fifteen or twenty trees on an acre, and, when fifteen or twenty feet high, run straggling furrows through the ground, and, wherever the roots are cut with the plough, new trees will start up, and will soon stock the ground with a plentiful growth."

Use.—It is observed in the *North American Sylva*, a celebrated work, by F. Andrew Michaux, that "The greatest consumption of locust wood is for posts, which are employed in preference for the enclosing of court-yards, gardens and farms, in the districts where the tree abounds, and the circumjacent country. They are transported for the same use to Lancaster, Baltimore, Washington, Alexandria, and the vicinity.—When the trees are felled in the winter, while the circulation of the sap is suspended, and these posts are allowed to become perfectly dry before they are set, they are estimated to last forty years. Experience has shown that their duration varies according to certain differences in the trees from which they are formed: thus about Lancaster, and at Harrisburgh, a small town on the Susquehannah, where a considerable trade is carried on in wood that is brought down the river, those trees are reputed the best whose heart is red; the next in esteem are those with a greenish-yellow heart; and the least valuable are those with a white heart. From this variety in the colour of the wood, which, probably, arises from a difference of soil, are derived the names of *red*, *green*, and *white* locust. In the Western States, there is a variety which is sometimes called *black* locust."

It is probable, that the locust with a "greenish-yellow heart," spoken of by M. Michaux is the same with that, which Mr. Briggs calls the *yellow* locust; and although M. Michaux supposes "this variety in the colour of the wood probably arises from a difference of soil," it is not impossible that there may be permanent specific differences in the several varieties. If so, the discovery is of importance.

M. Michaux says, "In naval architecture, the shipwrights use as much locust-wood as they can procure. It is as durable as the live oak and the red cedar, with the advantage of being stronger than the one, and lighter than the other."

With regard to the insect which destroys the locust, M. Michaux says, "Within eighteen or twenty years, an obstacle has unhappily appeared, which will contribute greatly to prevent the multiplication of the locust in all the anciently settled parts of the United States; this is a winged insect, which attacks the tree while standing, penetrates through the bark into the centre of the trunk, and, for the space of a foot, mines it in every direction, so that it is easily broken by the wind. This inconvenience is already so serious, as to induce many people to forego all attempts to form plantations of locust. In Virginia, I have not learned that trees of the natural growth have been visited by this destroyer, but those that have been reared about the plantations have already felt its ravages. This evil, which it appears difficult to remedy, will be more sensibly felt when the destruction of the forests now on foot, an inevitable consequence of the neglect of all measures of preservation, shall force the inhabitants to have recourse to plantations, which they will wish to form, in a certain proportion, of the locust. Hence it may result, that, disappearing successively from the American forests, by constant consumption, and not being reproduced on account of the insect, the locusts will become extremely rare in their native country, and abundant in Europe, where no similar catastrophe forbids their propagation."

The *Massachusetts Society for the Promotion of Agriculture* have offered a premium of fifty dollars "for a mode of extirpating the worm that attacks the locust-tree, which shall appear to the satisfaction of the trustees to be effectual."

The following, copied from a report of a committee of he *Essex Agricultural Society*, on farms in Essex county, Mass., (published in the *N. E. Farmer*, vol. iii. p. 145,) places the advantages to be anticipated from the culture of the locust in a fair, and, we believe, just point of view.

"A practical illustration of the advantages of cultivating the locust tree presented itself on the farm of Dr. Nichols. Several acres, that were, a few years since, barren and gravelly pastures, are now covered with a good coat of grass, almost entirely by reason of planting and permitting a growth of locust trees upon the land. This is easily done, after a few trees have taken root, either from the seed, or by being transplanted, and taking care that horned cattle do not go upon the land while the trees are young. In addition to the increase of feed, the trees themselves are well worthy of cultivation. No growth is more rapid, and none more in demand, or of greater value when arrived at maturity. It may be doubted whether an acre of land can be made to yield more in the course of twenty-five or thirty years, without the application of any manure, than by planting it with locust-trees. On a fair computation, the number of serviceable posts that might be obtained in this time would be from three to six hundred, worth from fifty cents to one dollar each. The increase of feed and surplus wood would fully pay the labour of cultivation; so that the proceeds of the timber would be the profits of the land.

"An objection to the cultivation of the locust-tree is often brought from the fact that they are sometimes destroyed by worms. This is true; but the ravages of this insect are found to be greatest where the trees are few and scattered. In the grove on this farm, which extends over a number of acres, and in the other groves in the vicinity, but very few of the trees are at all injured by worms. This objection is by no means sufficient to authorize the neglect of their cultivation. It certainly is of the highest importance to the farmers of Essex, to inquire how they can improve their pastures; or, rather, how they can save them from ruin; for it must be obvious to all, that, as at present managed, they are constantly growing worse, and many of them have already become of very little value. If, by planting them with trees, by ploughing, by applying plaster, as has been done, with good success, on the farm of Mr. Bartlett, or in any other way, they can be reclaimed, it surely is worthy of the experiment."

LOVE-APPLE.—*See* TOMATO.

MADDER.—*Rubia tinctoria.*—The following directions for raising this plant are copied from *The Emporium of Arts*:

"This plant may be propagated either by offsets or seeds. If the latter method is preferred, the seed should be of the true Turkish kind, which is called *Lizari*, in the Levant. On a light, thin soil, the culture cannot be carried on to any great profit. The soil in which the plant delights is a rich, sandy loam, being three feet in depth, or more.

"The ground, being first made smooth, is divided into beds four feet wide, with alternate alleys half as wide again as the beds. The reason of this extraordinary breadth of the alleys will presently appear. In each alley is to be a shallow channel for the convenience of irrigating the whole fields, &c. That part of the alley which is not occupied may be sown with legumes.

"The madder seed is sown broad-cast, in the proportion of from twenty-five to thirty pounds per acre, about the end of April. In a fortnight or three weeks, the young plants begin to appear; and from this time to the month of September, care must be taken to keep the ground well watered, and free from weeds.

'If the plants are examined in autumn, they will be ound surrounded with small yellow offsets, at the depth of two inches; and early in September, the earth from the alleys is to be dug out, and laid over the plants of madder, to the height of two or three inches. With this, the first year's operation ceases.

"The second year's work begins in May, with giving the beds a thorough weeding; and care must be taken to supply them with plenty of water during the summer. In September, the first crop of seed will be ripe; at which time the stems of the plants may be mown down, and the roots covered a few inches with earth, taken as before out of the alleys.

"The weeding should take place as early as possible in the spring of the third year; and the crop, instead of being left for seed, may be cut three times, during summer, for green fodder, all kinds of cattle being remarkably fond of it.

"In October, the roots are taken up, the offsets carefully separated, and immediately used to form a new plantation; and the roots, after being dried, are sold, either without further preparation, or ground to a coarse powder, and sprinkled with an alkaline lie.

"The roots lose four fifths of their weight in drying; and the produce of an acre is about two thousand pounds weight of dry, saleable madder."

"Madder usually sells for about thirty-two dollars per hundred; so that the produce of an acre, as above stated, would amount to six hundred and forty dollars."—*Farmer's Assistant.*

MANGEL WURTZEL.—*See* BEET.

MARJORAM ORIGANUM.—Of this herb there are four different species cultivated; the *pot*, *sweet*, *winter*, and *common*.

POT MARJORAM—*O. onites*—is a hardy, perennial, under shrub, a native of Italy. The stem rises more than a foot high, and is covered with spreading hairs; the leaves are small and acute, almost sessile, and downy on both sides. It is in flower from July to November, and is propagated from seed, but chiefly from rooted slips.

SWEET MARJORAM—*O. marjorana*—is a hardy biennial, a native of Portugal. It resembles the *O. Onites*, but the leaves have distinct petioles, and the flowers, which appear in June and July, are collected in small, close heads; and hence it is often called *knotted marjoram*. When in blossom, the herb is cut over, and dried for winter use, so that a sowing requires to be made every year.

The WINTER SWEET MARJORAM is the *O. Heracleaticum*, a hardy perennial, a native of Greece. The leaves of this species resemble those of *O. marjorana;* but the flowers come in spikes. It flowers from June to November, requires a sheltered, dry soil, and, seldom ripening its seeds, is propagated by slips and cuttings.

The COMMON MARJORAM is the *O. vulgare*, a native of Britain. It bears a considerable resemblance to the last named species. The flowers arise in sub-rotund panicles, in smooth, coloured spikes, of a reddish appearance, in July and August. This species is only used in cookery, in default of the others.

Culture.—The three first species prefer a light, dry soil; the other a calcareous soil and shady situation. For a seed-bed, three feet by three feet, a quarter of an ounce of seed is sufficient. Sow in April, on a compartment of light earth, either in small drills, or broad-cast; or, sow a portion in a hot-bed, if requisite to have a small crop forwarded. When the plants are one, two, or three inches high, thin the seed-beds, and plant those thinned out in a final bed, six inches apart, giving water; or, where larger supplies are required, some may remain thick where sown, to be drawn off by the root as wanted. The *pot*, *winter*, and *common marjoram* may be propagated from offsets, by parting the roots in spring and autumn. Plant in rows in beds, allowing a square foot for each plant.

Gather the tops of all the sorts as wanted for summer use; and when in full blossom, in July or August, for preservation through the winter.

Use.—All the species, but especially the three first, are aromatics, of sweet flavour, much used as relishing herbs in soups, broths, stuffings, &c. The young, tender tops and leaves together, are used in summer, in a green state; and they are dried for winter.—*Abridged from Encyc. of Gard.*

MELON.—*Cucumis melo*, and *Cucurbita citrullus.*—There are but two species, the melon with a rough or embroidered coat, called musk-melon, (*cucumis melo*,) and the melon with a smooth skin, called water-melon, (*cucurbita citrullus.*) Of each of the species there are many varieties. Mr. Russell's Catalogue contains the following:—

CUCUMIS MELO.

Green citron, (*finest variety*,)
Murray's pine apple,
Persian,
Nutmeg,
Minorca,
Large cantaleupe,
Pomegranite.

CUCURBITA CITRULLUS.

Carolina water,
Long Island do.
Apple-seeded do. (*early*.)

Seed.—Those who wish to procure melons in perfection, must be careful, in the first place, to procure good seed; secondly, to plant them remote from an inferior sort, as well as from cucumbers, squashes, gourds, and pumpkins; as degeneracy will infallibly be the consequence of inattention to these directions. Abercrombie says, "Seed under the age of two years is apt to run too much to vine, and show only male flowers; but new seed may be mellowed by being carried in the pocket a fortnight or more, till the heat of the body has dried and hardened it. Seed twenty years old has been known to grow, and make fruitful plants; but seed which has been kept three or four years is quite old enough, and less likely to fail than older."

Soil.—Abercrombie says, "The melon will succeed in any unexhausted loam, rich in vegetable rudiments, with a mixture of sand, but not too light. The following is a good compost; two thirds of top-spit earth from a sheep-common, adding sharp sand, if the earth contains little or none, till half is sand; one sixth of vegetable mould, and one sixth of well-consumed horse-dung. Or, if the earth is not obtained from a sheep-pasture, rotted sheep-dung may be substituted for the last. The ingredients should have been pulverized and incorporated by long previous exposure and turning over." Dr. Deane observed that "a good manure to be put under melons is an old compost of good loam, with the dung of neat cattle or swine."

Sowing melons in the open ground.—Mr. Armstrong says, "To succeed in raising them for market, the Honfleur method, as described by M. Calvel, may be employed.—Select a spot well defended against the north wind, and open to the sun throughout the day. If such is not to be found in your garden, create a temporary and artificial shelter, producing the same effect. At the end of March, form holes two feet in diameter, and distant from each other seven feet and a half; fill these with horse-dung and litter, or a mixture of mould, dung and sand. At the end of twenty days, cover the holes, which have been thus filled, with hand-glasses. When the heat rises to 36 of Reaumu., [113 Fahr.,] sow the seeds four inches apart; and when the plants have acquired two or three leaves, pinch off the end of the branch or runner.* This will produce lateral branches, which must again be pinched off, as soon as they respectively attain to the length of ten inches. When the plant has outgrown the glass, the latter becomes useless, and may be removed; but, should the weather be wet or chilly, substitute coverings of clean straw for that of the glasses, until the young plant becomes strong enough to bear the open air. Two or three melons only are left on each vine, and under each of these is placed a slate, without which the upper and under side will not ripen together. Two months are required to mature them. The people of Honfleur attribute their success in melon-raising to the *sea-vapour* which surrounds them, and to the *saline* particles contained in it, an advantage to be any where commanded, by dissolving a little salt in the water employed to moisten them." Whether a bed of slate would prove too warm for the melon in our climate, we cannot say. Perhaps shingles or boards might be preferable, as they would not be rendered so hot by the noon-day sun, nor so cold by the night air. We have never known salt, either in substance or solution, used as a manure for melons, but think it would be well to try its effects.

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* "There is much controversy among gardeners and savants on this point; nor are the *pinchers* entirely united in opinion, how far this practice should be carried. Some content themselves with taking off the cotyledons, when the

The following are M'Mahon's directions for raising melons in the open ground. Some time in May, "prepare a place of rich, sandy ground, well exposed to the sun; manure it, and give it a good digging; then mark it out into squares of six feet every way; at the angle of every square dig a hole twelve inches deep, and eighteen over, into which put seven or eight inches deep of old hot-bed dung, or very rotten manure; throw thereon about four inches of earth, and mix the dung and earth well with the spade; after which draw the remainder of the earth over the mixture, so as to form a round hill about a foot broad at top. Some people use hot stable-dung under an idea that its heat would promote the vegetation of the seed: this is a mistaken notion, as, in a few hours, it loses all it had, for want of a sufficient quantity being together to promote fermentation, and becomes a dryish wisp, unfit, at least for the present, to afford either heat or nourishment to the plants.

"When your hills are all prepared as above, plant in each, towards the centre, eight or nine grains of good mel-

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plant has acquired three or four leaves; while others take off the principal branches of the first eye above the fruit, and suppress all the secondary branches, male flowers and tendrils. These operations, says Mr. Bosc, are founded on bad reasoning. A cutting, which suppresses two thirds of the plant at once cannot fail to disorganize what remains."

on-seed, distant two inches from one another, and cover them about half an inch deep."

After-culture.—"When the plants are up, and in a state of forwardness, producing their rough leaves, they must be thinned to two or three in each hill. the extra number in some may serve to fill up deficiences in others: draw earth from time to time round the hills, and as high about the plants as the seed-leaves; when fit stop them. This operation should be performed when the plants have two rough leaves, and when the second is about an inch broad, having the first runner-bud rising at its base; the sooner this is detached, the sooner the plants acquire strength, and put out fruitful runners.

"It is to be done in the following manner:—

"You will see arising in the centre of the plant, at the bottom of the second rough leaf, the end of the first runner, like a small bud; which bud or runner, being the advancing top of the plant, is now to be taken off close, and may be done either with the point of a penknife or small scissors, or pinched off carefully with the finger and thumb; but, whichever way you take it off, be careful not to go so close as to wound the joint from whence it proceeds."

Armstrong says, "If the branches be vigorous and long, stretch them carefully over a level surface, and bury every fourth or fifth joint. This is best done by means of a wooden crotchet. The objects of pinching, or shortening the stem, are thus completely fulfilled, without any of the risk which attends that operation, and with advantages peculiar to this method; as, wherever the plant is buried, new roots are formed for the better nutrition of the stem and the fruit."

Setting.—"As the fruit-bearers come into blossom, you may assist the setting of the fruit, by impregnating some of the female blossoms with the male flowers, as directed for the cucumber. The melon, however, will also set naturally, and produce fertile seeds, if the time of fructification fall at a season when the glasses can be left almost constantly open."—*Aber.* Nicol says he has "proved, experimentally, that melons not impregnated will not swell off so fair and handsome as impregnated ones, and therefore considers it more necessary to attend to this operation in melons than in cucumbers."—*Loudon.*

Care of the fruit.—As the fruit increases to the size of a walnut, place a flat tile or slate under each, to protect it from the damp of the earth; the slab, thus interposed, will also assist the fruit to ripen, by reflecting the rays of the sun.—*Aber.* Nicol advises placing the fruit on bits of slate or glass some time before it begins to ripen; but by no means slate or moss the whole surface of the bed.

Forcing melons.—The "*Honfleur* method" of forwarding the production of melons, as stated by Mr. Armstrong, has been given, pp. 199, 200. The same writer continues, "If we want melons at a period earlier than this method will give them, we must employ a higher degree and a longer continuance of artificial heat; in a word, we must resort to *hot-beds*, and in these the point most important and difficult of attainment at the same time is, to secure a certain degree of heat, and no more, throughout the whole process. To lessen the difficulty in this case, gardeners, who understand their trade, make choice of those varieties which have the thinnest skins and the least bulk, as experience proves that, other things being equal, they require less heat than those of thicker rinds and greater size, and are of course less subject to some of the accidents to which this species of culture is exposed. In choosing the seeds, those of the last year are only to be used, because they are of quicker vegetation than old ones, and, accordingly, best fulfil the intention of the hot-bed, which is, to give *early* fruit. Another practice conducive to the safety of the plants, is, to sow the seeds in small pots, and then to plunge them into a hot-bed. If the heat be deficient, they are, in this case, made no worse than they would have been, if sown directly in the bed; and if it be excessive, it is only necessary to raise the pots, without in the smallest degree disturbing the plant. These things being premised, it but remains to show what ought to be the subsequent management after the seed has been sown, and the pots placed under the frames. One of the most important points now to be observed, is sufficiently to ventilate the bed, as well before as after the plants show themselves. This should be done at mid-day and in sunshine, and as often as a necessity for it shall be indicated by an accumulation of steam under the glasses. At night, these (the glasses) should be carefully covered with matting. These two preliminaries (ventilation in the day, and covering at night) being carefully observed, your plants will soon show themselves in a vigorous and healthy state, and may be kept in that condition by a continuation of the same means, and by moderately moistening the earth when it shall have become too dry. The water employed should be of the same temperature of the air under the frames; and, to secure this, it is well to keep a supply of it in a pot, placed in a corner of the hot-bed. In about a month, the plants, thus raised, will be fit for transferring to a second and larger hot-bed, constructed like the preceding, with the exception, that the mass of dung must now be greater, and that, after earthing, the bed should not be less than three and a half or four feet in depth. The plants, with the earth in which they grow, are now to be taken from the pots—an operation in which practice only will make us expert, and which consists in placing the neck of the plant between the first and second finger of the left hand, reversing the pot, and gently striking its sides till the earth be disengaged. The discharged mass is then placed in a hole, previously prepared in the square, where it is intended the plant shall ripen and produce."

Cutting the fruit.—Nicol observes, that "Melons, if allowed to remain on the plant till they be of a deep yellow colour, lose much of their flavour. They should, therefore, be cut as soon as they begin to change to a greenish-yellow, or, rather, as soon as they begin to smell ripe. They may lie in a frame for a day or two, if not immediately wanted, where they will acquire sufficient colour. But if they are let remain many days in the frame, they will become as insipid as if they had been left too long on the plant."

Saving seed.—The ordinary mode is to request the seeds of particularly fine fruits of approved sorts to be returned from table. The best way, however, is to pick some best ripe fruit, take out the seed, clean it from the pulp, and let it be well dried and hardened; and then put it up in papers.—*Abercrombie.* Nicol says, wash it very clean, skimming off the light seeds, as those only which sink in water will grow. Great care must be taken that the sorts from which seeds are saved are genuine and distinct. When different sorts are planted in the same bed, this cannot be the case.

Second crop from the same plants.—"When the fruit of the first crop is off, a second crop may be obtained from the same stools, which often proves more productive than the first. If the first crop is taken before the middle of June, the second will come at a very good time. For this purpose, as soon as the fruit is cut, prune the plant. Shorten the vigorous, healthy runners, at a promising joint, to force out new laterals, cutting about two inches above the joint. At the same time, take off all decayed or sickly vines, and all dead leaves. Stir the surface of the mould, and renew it partially by three inches' depth of fresh compost. Water the plants copiously, shutting down the glasses for the night. Shade in the middle of hot days; and give but little air, until the plant has made new radicles and shoots. Afterwards repeat the course of culture above described, from the stage when the first runners are sent out till fruit is cut."—*Loudon.*

Insects and diseases.—To prevent melon-plants from being infested with insects, or injured by diseases of any kind, no better method can be adopted than to keep the plants constantly in a healthy, vigorous, growing state; for this purpose, M'Phail observes, "They must be constantly attended to, giving them plenty of heat and water. In warm weather, in the spring and in summer, they should be watered occasionally all over their fruit and leaves, till the earth in which they grow be thoroughly moistened." In this country, melons and cucumbers are much infested by a small yellow bug, and perhaps the best method of securing them is covering the plants with a frame, on which millinet is stretched and fastened, as directed under the article CUCUMBER.

Use.—The use of melons, as a palatable and wholesome article of diet, is too well known to need any remarks. Dr. Mease, of Philadelphia, observes, that "The juice of the sweeter kind of water-melon yields, on inspissation, a bright light-coloured syrup, which would answer every purpose required of any syrup. Mr. Henry Drinker, of Philadelphia, procured half a pound of this syrup, from fourteen pounds of melon juice, a part of which I tasted, and found very pleasant." To make the most of unripe melons, Loudon's Magazine directs to "boil them, and season them with spices and salt, or bake them like a pumpkin-pie." The rind of the water-melon is also used for pickling, &c.

MINT.—*Mentha.*—This is a genus of plants comprising twenty-four species. Those cultivated in gardens are peppermint, *(M. piperita;)* spearmint, *(M. viridis;)* penny-royal-mint, *(M. pulegium.)*

Culture.—All "the species are raised by the same methods, viz. by parting the roots, by offset young plants, and by cuttings of the stalks. Spearmint and peppermint like a moist soil; penny-royal, a strong loam. The plants set in spring or summer will come into use the same year. They may be placed about eight inches apart, on beds about four feet wide, allowing a path two feet broad. New beds should be made every three years.

Gathering the crop, and use.—"Mint should be cut for drying," says Philips, "just when it is in flower, and on a fine day; for if cut in damp weather, the leaves will turn black. It should be tied in small bunches, and dried in a shady place, out of the wind; but, to retain its natural virtues more effectually, it has been found better to place the mint on a screen, and to dry it quickly before a fire, so that it may be powdered and immediately put into glass bottles, and kept well stopped. Parsley, thyme, sage, and other herbs, retain their full fragrance when thus prepared, and are by this mode secured from dust, and always ready to the hand of the cook.

"A conserve made of mint is grateful, and the distilled waters, both simple and spirituous, are much esteemed. The juice of spearmint, drank in vinegar, often stops the hiccup. Lewis observes, what has before been observed by Pliny, that mint prevents the coagulation of milk, and hence it is recommended in milk diets.'

MULBERRY.—*Morus.*—*See* SILK.

MUSHROOM.—*Agaricus.*—This is a genus of plants comprising a great many species, of which, according to some authors, three hundred are natives of Great Britain. The kind cultivated in gardens is the *Agaricus campestris*, which is thus described by M'Mahon:—"The *gills* of this are loose, of a pinky red, changing to liver colour, in contact, but not united with the stem; very thick set, some forked next the stem, some next the edge of the cap, some at both ends, and generally, in that case, excluding the intermediate smaller gills. *Cap*, white, changing to brown when old, and becoming scurfy, fleshy, and regularly convex, but with age flat, and liquefying in decay; *flesh* white; diameter commonly from one inch to three, or sometimes four or more. *Stem* solid, one to three inches high, and about half an inch in diameter."

Loudon says, "The mushroom is a well known native vegetable, springing up in open pastures in August and September. It is most readily distinguished, when of middle size, by its fine pink or flesh-coloured gills, and pleasant smell; in a more advanced stage, the gills become of a chocolate colour, and it is then more apt to be confounded with other kinds of dubious quality; but that species which most nearly resembles it, is slimy to the touch, and destitute of the fine odour, having rather a disagreeable smell: further, the noxious kind grows in woods, or on the margins of woods, while the true mushroom springs up chiefly in open pastures, and should be gathered only in such places."

Mr. Armstrong gives the following directions for cultivating the garden mushroom:—"Prepare a bed, early in October, either in a corner of the hot-house, if you have one, or a dry and warm cellar. The width of the bed at bottom should not be less than four feet, and its length in proportion to the spawn provided. Its sides should rise perpendicularly one foot, and should afterwards decrease to the centre, forming four sloping surfaces. We need hardly say that the material of the bed at this stage of the business must be horse-dung, well forked, and pressed together to prevent its settling unequally. It should then be covered with long straw, as well to exclude frost as to keep in the volatile parts of the mass, which would otherwise escape. After ten days, the temperature of the bed will be sufficiently moderated, when the straw is to be removed, and a covering of good mould, to the depth of an inch, laid over the dung. On this the seed or spawn of the mushroom [which are threads or fibres of a white colour, found in old pasture-grounds, in masses of rotten horse-dung, sometimes under stable-floors, and frequently in the remains of old hot-beds] is to be placed in rows, six inches apart, occupying all the sloping parts of the bed, which is again to be covered with a second inch of fresh mould and a coat of straw. If your bed has been well constructed, your mushrooms will be fit for use at the end of five or six weeks, and will continue to be productive for several months. Should you, however, in the course of the winter, find its productiveness diminished, take off nearly all the original covering, and replace it with eight or ten inches of fresh dung and a coat of clean straw. This, by creating a new heat, will revive the action of the spawn, and give a long succession of mushrooms."—*Mem. of N. Y. Board of Agr.* vol. ii. p. 125.

Use.—The garden mushroom is eaten fresh, either stewed or boiled; and preserved as a pickle, or in powder, or dried whole. The sauce commonly called *ketchup* (supposed, by Martyn, from the Japanese, *kit-jap*) is or ought to be made from its juice with salt and spices. Wild mushrooms from old pastures are generally considered as more delicate in flavour, and more tender in flesh, than those raised in artificial beds. But the young or butter mushrooms, of the cultivated sort, are firmer, and better for pickling; and in using cultivated mushrooms, there is evidently much less risk of deleterious kinds being employed."—*Neill* and *Martyn*.

"*Antidote to poisonous sorts.*—All fungi should be used with great caution, for even the *champignon* and edible garden-mushrooms possess deleterious qualities when grown in certain places. All the edible species should be thoroughly masticated, before taken into the stomach, as this greatly lessens the effects of poisons. When accidents of this sort happen, vomiting should be immediately excited, and then the vegetable acids should be given, either vinegar, lemon-juice, or that of apples; after which, give ether and antispasmodic remedies, to stop the excessive bilious vomiting. Infusions of gall-nut, oak-bark, and Peruvian bark are recommended as capable of neutralizing the poisonous principle of mushrooms. It is, however, the safest way not to eat any of the *good*, but *less common* sorts, until they have been soaked in vinegar. Spirit of wine and vinegar extract some part of their poison; and tannin matter decomposes the greatest part of it."—*Botanist's Companion*, vol. ii. p. 145.

MUSTARD.—*Sinapis.*—Of this plant there are two species in cultivation, the *black* and the *white;* annuals, and natives of Great Britain.

The following are Loudon's directions for the culture of the white mustard, *S. alba*. For spring and summer consumption, sow once a week or fortnight, in dry, warm situations, in February and March; and, afterwards, in any other compartment. "In summer, sow in shady borders, if it be hot, sunny weather; or, have the bed shaded. Generally, sow in shallow, flat drills, from three to six inches apart; scatter the seed thick and regular, and cover in thinly with the earth, about a quarter of an inch. To furnish gatherings in winter or early in spring, sow in frames or under hand-glasses; and when the weather is frosty, or very cold, in hot-beds and stoves."

Use.—"This species," according to Loudon, "is cultivated chiefly as a small salad, and is used like cresses, while in the seed: when these are newly expanded, they are mild and tender; but when the plants have advanced into the rough leaves, they eat rank and disagreeable." "In Spain, and throughout the south of Europe, the seed of the white species is preferred, for the fabrication of mustard, because giving a whiter and milder flour than the seed of the black."—*Armstrong.*

The seed of this plant is also celebrated for its medical virtues, being at once a tonic and an aperient; cleansing the stomach and bowels, and bracing the system at the same time.—See *N. E. Farmer*, vol. vi. p. 188.

Black mustard—*S. nigra*—is a larger plant than the white, with much darker leaves, and their divisions blunter.

Use.—"Black mustard is chiefly cultivated in fields for the mill, and for medicinal purposes. It is sometimes, however, sown in gardens, and the tender leaves used as greens, early in the spring. The seed leaves, in common with those of the cress, radish, rape, &c., are sometimes used as a salad ingredient; but the grand purpose for which the plant is cultivated, is for seeds, which, ground, produce the well known condiment. If the seeds, Dr. Cullen observes, be taken fresh from the plant, and ground, the powder has little pungency, but is very bitter; by steeping in vinegar, however, the esential oil is evolved, and the powder becomes extremely pungent. In moistening mustard-powder for the table, it may be remarked, that it makes the best appearance when rich milk is used; but the mixture, in this case, does not keep good for more than two days. The seeds of both the black and white mustard are often used, in an entire state, medicinally."

Culture for the mill.—"To raise seed for flour of mustard, and other officinal occasions, sow, either in March or April, in any open compartment; or make large sowings in fields, where designed for public supply. Sow moderately thick, either in drills, from six to twelve inches asunder, or broad-cast, and rake or harrow in the seed. When the plants are two or three inches in the growth, hoe and thin them moderately where too thick, and clear them from weeds. They will soon run up in stalks, and, in July or August, return a crop of seed ripe for gathering."—*Abercrombie.*

NECTARINE.—*Amygdalus Persica.*—This is, by some writers, considered as the same fruit with the peach, and its culture is the same. See art. Fruit, for its different kinds, and Peach, for its culture.

NURSERY.—In establishing a nursery, two points should be contemplated—fitness as to the disposal of the produce, and fitness as to shelter, aspect, and soil. Regard must be had to the leading roads of the district, the means of carriage by land or water, the objects which will probably be most in demand, whether seedlings, fruit-trees, vines, native plants, tender exotics, or all these united.

"In order to have a complete nursery, it should contain soils of various qualities, and not less than eighteen inches or two feet deep; the generality of it should be light, friable earth; a part of it should be of a clayey nature, and another part should be mossy. Each of these will be found peculiarly useful in the raising of the different kinds of young plants. The whole should be well drained and trenched, and cropped with vegetables for one, or even two years, previously to sowing tree seeds. For transplanting, it may be used the first year. A nursery may certainly be over-sheltered; but this is likely to happen only in the case of its being very small; for, if it extend to several acres, unless it be surrounded by very tall trees, the area will be considerably exposed. No part should be either too much exposed, or too much sheltered. Any aspect from east to west, following the course of the sun, will answer. Ground of an unequal surface is most likely to contain the various soils above-mentioned. A nursery should, therefore, in general, rise from a level to a pretty smart acclivity, yet no part of it should be too steep, because it is, in that case, very troublesome to labour. The nursery ground may be sufficiently fenced by a stone wall, or even a hedge, six feet high; and if it be of small size, an acre or thereabouts, it will require no other shelter over all the space. The fence, whether of thorns or stone, should be made proof against the admission of hares or rabbits. It should be subdivided into compartments and borders, of proportionate size to the contents of the area, by walks. The compartments should never be encumbered with large trees, as apples, pears, or the like, because, being already established in the ground, they never fail to rob the young trees of their food, and to cause them to be poor and stunted, unworthy of being planted. It would be very convenient to have a rill of water passing through the ground, or to have a small pond, fed by a spring, or a pipe, for the purpose of watering.

"In preparing the soil for the culture of trees, it will be advisable to trench it to its full depth, and necessary to give it a good dressing of lime or marl, or dung in compost. Rank manure, such as stable-litter, should not be applied to nursery ground, at the time of cropping with nursery articles; but if it be necessary to enrich it, this should be done by a manured crop of onions, turnips, lettuces, or the like Potatoes should never go before a crop of seedlings, even of the coarser sorts, as ash, oak, or chestnut; because potatoes never can be taken clean out of the ground; and, it being indispensable to pull up those which rise among the tree seedlings, many of these unavoidably come up along with them."—*Nicol's Planter's Calender.*

"A rotting ground will be required for the preparation of certain seeds, by mixing them with sand, ashes, or soil, and leaving them there for different periods, from six months to two years, to rot off their interior coverings. On a small scale, a portion of the compost ground of the kitchen-garden may be used for this purpose. If the scale is large, an area of a few square poles should be set apart for bedding in plants taken up for replanting, or what is called laying in by the heels, or sloughing: this is generally called *the bedding ground*, or, in Scotland, *the sloughing ground.*"—*Loudon.*

"It has been a received opinion, that the soil for a nursery should not be made rich, as the plants, when removed to a more fertile soil, will flourish more luxuriantly; but later observation has decided, that the reverse of this will be found correct. There is a close analogy between vegetable and animal life; and it is a dictate of nature, that both require a full supply of nutriment, from their earliest existence. It would be absurd to suppose, that the tender roots of young seedlings are capable of drawing sufficient nutriment from a rank, barren, and uncultivated soil, and those that are barely supported, or nearly starved at first, will never afterwards become vigorous, stately, and handsome, though surrounded by the richest mould. Repeated experiments have proved that a strong and vigorous plant, that has grown up quickly, and arrived at considerable magnitude in a short time, never fails to grow better, after transplanting, than another of the same size, that is older and stunted in its growth. Where the soil is poor and lean, trees, in every stage of their growth, are observed to be languid, weak, and stunted; while those reared in a good, mellow soil, always assume a free growth, and advance with strength and vigour. It is evident, therefore, that the ground to be occupied for a fruit nursery, requires to be made rich and fertile. The soil should also be deep, well pulverized, and cleared of all roots and weeds. The seeds may be sown either in autumn or April, and, in one year after, the young plants may be taken up, and replanted in the nursery. It is important that the situation be such as to admit of a free circulation of air, and open to the sun, that the plants may be preserved in a healthy condition. Plants, reared in a confined and shaded situation, in a large town, and removed to an open exposure in the country, will long continue in a debilitated condition; like a puny city invalid, their growth will be greatly impeded, and many years will elapse before they attain to a state of vigour, health, and hardihood.

"In *Marshall's Rural Economy* it is directed, that the seedling plants, when taken from the seed-bed, be sorted agreeably to the strength of their roots, that they may rise evenly together. The tap, or large bottom root, should be taken off, and the longer side-root-lets should be shortened. The young plants should then be set in rows, three feet apart, and from fifteen to eighteen inches asunder, in the rows; care being taken not to cramp the roots, but to bed them evenly and horizontally among the mould. In strictness of management, they ought, two years previous to their being transferred to the orchard, to be transplanted into unmanured, double-dug ground, four feet every way apart, in order that the feeding fibres may be brought so near the stem, that they may be removed with it into the orchard, instead of being, as they generally are, left behind in the nursery. Hence, in this second transplanting, as in the first, the branches of the root should not be left too long, but ought to be shortened in such a manner as to induce them to form a regular globular roof, sufficiently small to be removed with all their plants, yet sufficiently large to give it firmness and vigour in the plantation."—*Thacher's Orchardist.*

A nursery should not be on a spot where fruit-trees have lately grown, or, indeed, any other deep-rooted plants. Miller advises to have a nursery of forest-trees in the place where the forest is designed to be planted, so that a sufficient number of the trees may be left standing, after the rest have been removed.

"If a nursery be in such a situation that the young trees are in danger of being broken down by deep snows, either the fence on the windward side should be made so open that the wind may have a free passage through it, and drive away the snow, or else the trees may be defended by staking. A stake a little taller than the tree, made of a slip of board, should be set close on the windward side, and the top of the tree fastened to it with a soft string; or two such stakes may be so set that the upper ends may meet over the top of the tree."—*Deane.*

The seeds which are sown in a nursery should be selected from the best sorts of fruit. See p. 17 of this work.

OAK.—*Quercus.*—Miller's *Gardener's Dictionary* says, oaks are best produced from the acorns in the places where the trees are to remain; because those which are transplanted will not grow to so large a size, nor remain sound so long. He advises to plant the acorns as soon as they are ripe in October, which will come up in the following April. But, says Dr. Deane, " Another writer directs that the acorns be gathered in autumn, and kept in a box or boxes of sand till the following spring. Then open them, and carefully plant those of them which are sprouted, which, he says, will not fail to come up. But no time should be allowed for the sprouts to dry. I incline to prefer this method, especially since I have tried that which is recommended by Miller without success. Not one in a hundred ever came up."

The ground designed for a plantation of oaks, according to Miller, should have a good and durable fence, should be prepared by three or four ploughings and harrowings—the acorns should be taken from the largest and most thrifty trees —be sowed in drills about four feet asunder, and two inches deep, and two inches apart in the drills. The ground should be ploughed and hoed among them, during the first eight or ten years; after two years, some of the plants should be drawn out where they are too close; and so from time to time, as they grow larger, till they come to be eight feet distance each way, when they will want no thinning for a long time. But after the trees come to be large, he thinks twenty-five or thirty feet apart will be the right distance.

The oak thrives better in hilly than in boggy ground, but flourishes most luxuriantly on rich, black soils, or in strong, moist loam. It will grow, however, on almost any soil that is not too wet.

The Massachusetts Society for the Promotion of Agriculture have offered a premium of one hundred dollars for the best plantation of white oak trees, not less than one acre, nor fewer than one thousand trees per acre, to be raised from the acorn, and which trees shall be in the best thriving state on the first of September, 1827.

It is observed, in the work called *Gleanings*, &c. *on Husbandry and Gardening*, that oaks, " when very young, may be transplanted twice or thrice, if, each time, the principal root is cut off. Oaks raised from the acorn without removing, on account of the tap-root striking down into the ground, where there is less nourishment, grow slowly, but are, when they arrive at timber, the best; being generally fuller at heart, and more strong and lasting. Oak plants of one or two years' growth, after they have taken root, are often cut off a little above the ground, if they are stunted or crooked, and the second shoot is trusted to for the tree; as it is found to grow with greater luxuriance than the first.

OKRA.—*Hibiscus esculentus.*—A valuable garden plant, easily propagated by seeds sown in May. It is said to be excellent in cookery, as a sauce. Its ripe seeds, burned, and used as coffee, can scarcely be distinguished therefrom. It should be planted about an inch deep, and hoed two or three times, like peas. M'Mahon says, "It may be sown with certainty of success at the time that Indian corn is planted. Draw drills about an inch deep, and four feet asunder, into which drop the seeds at the distance of eight inches from one another, or rather drop two or three in each place, lest one should not grow, and cover them an inch in depth. As they advance in growth, earth them up two or three times as you do peas, and they will produce abundantly."

ONION.—*Allium cepa.*—The common bulbous onion is a biennial plant, supposed to be a native of Asia. There are many varieties of this plant. Those mentioned in Mr. Russell's Catalogue are the following:—

White Portugal,
Yellow,
Genuine Madeira,
Top or tree onion,
Silver-skinned,
Strasburgh,
Large red,
Potato onion.

The Strasburg is most generally adopted for principal crops. The silver-skinned is reckoned among the best for pickling. "The top or tree onion has the remarkable property of producing the onions at the top of the stalk, and is valuable for domestic use, particularly for pickling, in which they are excellent, and superior in flavour to the common kinds. It is also used for any other purpose that onions usually are. It is perennial, and propagated by planting the bulbs in spring or autumn, either the roots, bulbs, or those on the top of the stalks."—*Russell's Catalogue.*

Soil and culture.—The onion, "to attain a good size, requires rich, mellow ground, on a dry sub-soil. If the soil be poor or exhausted, recruit it with a compost of fresh loam and well-consumed dung, avoiding to use stable-dung in a rank, unreduced state. Turn in the manure to a moderate depth; and, in digging the ground, let it be broken fine. Grow pickles in poor, light ground, to keep them small. The market-gardeners at Hexham sow their onion-seed on the same ground for twenty or more years in succession, but annually manure the soil. After digging and levelling the ground, the manure, in a very rotten state, is spread upon it, the onion-seed sown upon the manure, and covered with earth from the alleys, and the crops are abundant, and excellent in quality."—*Hort. Trans.* i. 121.

Deane's *New England Farmer* says, "A spot of ground should be chosen for them, which is moist and sandy; because they require much heat and a considerable degree of moisture. A low situation, where the sand has been washed down from a neighbouring hill, is very proper for them. And if it be the wash of a sandy road, so much the better. The most suitable manures are old, rotten cow and horse-dung mixed, ashes, but especially soot. A small quantity of ashes or sand, or both, should be spread over them after sowing, especially if the soil be not sandy. And it is not amiss to roll the ground after sowing; or harden the surface with the back of a shovel."

Mr. Armstrong says, "It is propagated either by the seed or by the bulbs. In the first case, you sow in shallow drills, twelve or fourteen inches apart; cover with mould, and, when the plants come up, thin them, so that they may stand three or four inches from each other. The sooner this is done in the spring, after the earth has acquired a temperature favourable to vegetation, the better will be your crop. It only remains to keep the earth loose and clean about the roots, and, if the vegetation be too vigorous, to break down the tops, so as to determine the juices to the bulbs. In the other case you but employ the small and half-grown onion of the preceding fall instead of seed."

Mr. Hubbard, of Concord, Mass. in an article published in the *N. E. Farmer*, vol. iii. p. 89, says, "The soil ought to be a *deep*, *black loam*, that will crumble fine when the plough passes through it; such as is easily raked smooth and pulverized. A heavy, clammy soil, that adheres together when both wet and dry—a dry, clayey, or a sandy soil, will not answer. I know of no vegetable that is so difficult to please with a soil, as the onion: though they will grow well, yet they will not ripen, but hold green throughout the fall, and many of them will be what are generally known by the name of *scullions*, with the neck stiff and green; whereas those on suitable ground are ripe and dry by the first of September. Rotten stable-manure, made in the winter preceding the spring in which it is put on the land, is generally made use of, to be spread on the ground, and ploughed in. I have a piece of land four rods square, on which onions have been raised, I suppose, these *eighty years;* and since I have improved it, I have yearly spread upon it five cart-loads of manure, such as are usually drawn by one pair of oxen; and have raised from *four* to *seven hundred* bunches of onions upon it, at three and a half pounds to the bunch, of which about sixteen make a bushel."

Mr. Hubbard puts the seed into the ground as soon as the frost is out, and it is sufficiently dry to be worked; frequently the latter part of March, but more frequently in the first days of April. He has always planted them in *hills*, which is the general practice in Concord. "My method of preparing the ground and planting the seed is, *first*, carry on the manure, and spread it as even as possible, when the ground is to be ploughed deep; *then* let the plat be divided into beds, about three feet nine inches wide; to do which the easier way is to stretch a line across, lining one bed at a time; after this, let a man, with a shovel or a potato-hoe, make an alley through the whole piece, to separate the beds, about four inches deep, and sufficiently wide to admit a person to walk in it. Then let the lumps be beat fine, levelling the ground, and shaping the beds; which, after being raked smooth, must be divided into squares of eight or nine inches. This is best done by a line; or it is sufficiently exact to draw a heavy rope backwards and forwards. Now let the seeds, six or seven in a hill, more or less, be dropped into the corners of the squares, and covered with mould, about half an inch deep, pressed down with the hand."

A writer for the *N. E. Farmer*, vol. iii. p. 249, with the signature J. M., recommends "a moist, black soil," as best, but says "a free, deep loam will answer very well." "The onion is not by nature inclined to root deep. You must give it a hard bottom to grow on, and keep your manure on the surface within reach of the roots; then they will grow large, flat, and handsome."—Advises to sow the same piece for several successive years. "I have always *sowed onions in drills*, about eighteen inches apart, to give fair play to the hoe. Onions must be sowed as early as possible after the frost is out of the ground: in this climate, if the seed is not in the ground before the first of May, there is but little chance for a crop. It must be covered slightly, and stamped well over with the hoe to close it well. I would recommend, as most essential, to sow the seed sparingly. Even the best gardeners are apt to put in too much seed. The consequence is, that the young plants come up so thick that they run up spiry and weak; and, when you come to thin them, you find great difficulty to pull up so many without injuring those that you leave; and the worst injury is what you do to the roots, which you tear and loosen. Therefore have seed of your own raising, or that you know is fresh, and sow sparingly."

In the *N. E. Farmer*, vol. iii. p. 265, are the observations of I. Tucker, Esq. of Salem, Mass., who says, "The land should be ploughed about four inches in depth, and harrowed so as to make it very fine; the manure, which should always be a rich compost, should be ploughed in and thoroughly mixed; the land should then be rolled with a heavy roller, to form a close bottom for the bulbs to form upon, and at the same time not so hard as to prevent the small roots of the plant from penetrating. The best onions and the largest crops are produced where the bulbs grow almost entirely on the top of the ground. After the ground has been rolled, and before the seeds are sown, the beds should be raked with a sharp iron rake, to prepare a finely pulverized drill for reception of the seed; and, after the seeds are sown, the drill should be pressed with a board and sufficient weight to bring the earth into close contact with the seed. Care should be taken in selecting seed; none should be sown but such as will be sure to vegetate; and it would be well if no more seed were to be sown than you would have plants to remain and grow in the drill. It would be superfluous to add that, if you would have a good crop of onions, you must not permit a crop of weeds to grow in the same bed; they will not grow well together."

Mr. Adams Knight, of Newbury, Mass., received a premium of twenty dollars for having raised, in 1822, the greatest quantity of onions, being six hundred and fifty-one bushels on one acre. "The soil is a rich, gravelly loam, with a gravel bottom: in 1821 it was cultivated with onions and cabbages, and was manured with about five cords of barn manure, and produced a good crop: after the crop was off the ground, there were five cords of barn manure and two and a half of leached ashes ploughed in: in April, 1822, it was once ploughed, and sowed in rows 14 inches apart, which took between three and four pounds of seed: in the course of the season, it was hoed between the rows, and weeded four times: in September, the onions were harvested, and there were six hundred and fifty-one bushels. The entire expense of cultivating this acre of onions, including twenty-one dollars and thirty-seven cents, the cost of the manure, was fifty-seven dollars and thirty-eight cents."

The work entitled *Gleanings*, &c. *in Husbandry*, directs to sow onions, if possible, in a dry time, and to tread them in, in light ground.

Loudon says, "When onions are to be drawn young, two ounces of seed will be requisite for a bed four feet by twenty-four; but when to remain for bulbing, one ounce will suffice for a bed five feet by twenty-four feet."

Deane says, "The ground should be dug or ploughed in autumn, not very deep; and then made very fine in the spring, and all the gross roots and roots of weeds taken out; then laid in beds four feet wide. Four rows of holes are made in a bed, the rows ten inches apart, and the holes in the rows ten. About half a dozen seeds are put in a hole, or more, if there be any danger of their not coming up well, and buried an inch under the surface. They will grow very well in bunches. Though the largest onions are those which grow singly some inches apart, those which are more crowded produce larger crops. And the middle-sized onions are better for eating than the largest." The last week in April is the proper time for sowing, according to this author.

The course of culture recommended by Abercrombie for the summer, and what he calls winter-laid-by crops, is as follows:—"Allot an open compartment, and lay it out in beds, from three to five feet in width. Sow broad-cast, equally over the rough surface, moderately thick, bed and bed separately, and rake in the seed lengthwise each bed, in a regular manner. When the plants are three or four inches high, in May and June, let them be timely cleared from weeds, and let the principal crop be thinned, either by hand, or with a small, two-inch hoe; thinning the plants to intervals of from three to five inches in the main crops designed for full bulbing; or, some beds may remain moderately thick for drawing young, by successive thinnings, to the above distance. For the Spanish, from seed obtained immediately from Spain, the final distance should be six or seven inches. Keep the whole very clear from weeds, in their young and advancing state. The plants will begin bulbing a little in June; more fully in July; and be fully grown in August to large bulbs. In July or August, when the leaves begin to dry at the points, and turn yellow, lay the stems down close to the ground, bending them about two inches up the neck, which promotes the ripening of the bulb, particularly in wet or backward seasons. The crop of full bulbers will be ready to take up towards the middle of August. When the necks shrink, and the leaves decay, pull them wholly up in due time: spread them on a compartment of dry ground, in the full sun, to dry and harden completely, turning them every two or three days; and in a week or fortnight they will be ready to house. Clear off the grossest part of the leaves, stalks, and fibres; then deposit the bulbs in some close, dry apartment, in which sometimes turn them over, and pick out any that decay; and they will thus keep sound and good, all winter and spring, till May following."

Culture of a winter-standing crop, to be drawn for use the succeeding spring.—"Allot a soil rather more light and sandy for the summer crop, on a sub-soil at least equally dry. The compartment, especially for any of the biennial kinds, should lie warm and sheltered. The beds may be three or four feet wide, running parallel to the best aspect. The medium time for the principal sowing falls about the 7th of August; and, for a secondary crop, near the 25th. Sow the bulbing sorts and the Welsh perennial separately; distribute the seed pretty thickly. If the soil be dry and light, tread down the seed evenly along the surface of each bed, and then rake it in neatly. When the plants are come up one, two, or three inches, carefully hand-weed in time, before any rising weeds spread; not thinning the plants, because they should remain thick, for their chance in winter, and to be, by degrees, drawn thinningly, for use in salads and otherwise; but reserve a principal supply to remain till spring. Observe, the Welsh onion, in particular, commonly dies down to the ground about mid-winter; but the root part, remaining wholly sound, sends up a new, vigorous stem in February and March. At the opening of spring, let the whole of both sorts be well cleared from weeds; they will continue fit to draw young during all the spring months, till May; then let some of the bulbous kinds be thinned, to remain for early bulbing in June and July; but, as they will soon after shoot up in stalk, they are chiefly for present use, not being eligible as keeping-onions."

To preserve onions through the winter, they may be tied together, forming what are called ropes or bunches of onions, and kept in a dry and cool cellar. Moisture rots, and warmth causes them to vegetate. A considerable degree of cold will not injure them, for they resist frost in consequence of a spirituous substance of which they are in part composed. Searing their fibrous roots with a hot iron will prevent them from sprouting.

To obtain seed from onions, they should be planted early in beds, about nine inches apart. The largest and soundest are best. They should be kept free from weeds; and, when the heads of the flowers begin to appear, each plant must have a stake about four feet long, and its stems be loosely tied to the stake by a soft string. Or the stems may be supported by stakes, six or eight feet apart, and pack-thread or rope-yarn fastened from one to the other, a little below the heads. When ripe, the heads are to be cut (or the seed will shed) and spread in the sun, on coarse cloths, to dry; being, however, taken under shelter at night, and in rain. When the seed is beaten out, it is to be dried one day in the sun, and then put in bags to preserve for sowing.

Dr. Deane, and Mr. Nicholson, author of the *Farmer's Assistant*, condemn the practice of beating or breaking down the tops of onions in order to increase the size of the root. Mr. Nicholson observed, "The practice is undoubtedly injurious, as we have seen confirmed by experiment."

"*Culture of the potato onion.*—This variety, erroneously supposed to have been brought from Egypt by the British army about 1805, was grown in Driver's nursery, in 1796, and has been known in Devonshire for upwards of twenty years. It is thus cultivated at Arundel Castle, by Maher:—Having thoroughly prepared the ground, and formed it into beds four feet wide, 'I draw lines the whole length, three to each bed, and, with the end of the rake-handle, make a mark (not a drill) on the surface; on this mark I place the onions, ten inches apart; I then cover them with leaf-mould, rotten dung, or any other light compost, just so that the crowns appear exposed. Nothing more is necessary to be done until they shoot up their tops; then, on a dry day, they are earthed up, like potatoes, and kept free from weeds, until they are taken up. In the west of England, where this kind of onion is much cultivated, I understand that it is the practice to plant on the shortest day, and take up on the longest. The smallest onions used for planting swell, and become very fine and large, as well as yield offsets; the middle-sized and larger bulbs produce greater clusters.'—*Hort. Trans.* vol. iii. p. 305.

"Dymond states, (*Hort. Trans.* vol. iii, p. 306,) that in Devonshire it is planted in rows, twelve inches apart, and six inches' distance in the row; that the plants are earthed up as they grow, and that the smaller bulbs yield a greater increase than the larger. A similar practice is adopted by some Scotch cultivators.—*Caled. Hort. Mem.* vol. i. p. 343, and vol. iv. p. 216.

"Wedgewood does not earth up, and finds his bulbs acquire a much larger size than when that practice is adopted. —*Hort. Trans.* vol. iii. p. 403. The fact is, as we have observed in generalizing on the subject of earthing up, surface-bulbs, as the onion, turnip, &c., are always prevented from attaining their full size by that operation, whatever they may gain in other respects."—*Loudon.*

Use.—"The properties of onions in no respect differ from those of garlic, excepting that the former are less pungent, (see Garlic,) and are, therefore, more generally used for culinary purposes. Many persons, however, dislike them on account of the strong and disagreeable smell which they communicate to the breath. But this inconvenience is obviated by eating a few raw leaves of parsley, immediately after partaking of onions, the scent of which is thus nearly removed, and they are, at the same time, rendered more easy of digestion. Vinegar also answers the same purpose."—*Dom. Encyc.*

ORCHARD.—*Soil.*—Any soil is suitable for an orchard, which produces good crops of grain, grass, or garden vegetables; but a good, deep, sandy loam, not too dry, nor very moist, is to be preferred. In the stiffest part of the ground, you may plant pear-trees; in the lighter, apples, plums, and cherries; and, in the lightest, peach, nectarine, and apricots.

Aspect.—A south-eastern aspect is generally recommended; but, when this exposes the trees to the sea winds, a south-western may be better. Some recommend a northern aspect, and planting trees the north side of a wall, to prevent them from budding and blowing so early in the spring as to expose them to frosts.

Preparation of the ground.—If the land be swarded, it should be broken up and tilled at least one year before the trees are planted.

Manure.—Rotten leaves, or the mould formed by the decomposition of leaves, is recommended by Forsyth. Compost, or rich earth, is said to be preferable to dung, which encourages insects and blight. M'Mahon says, "It is well known that where hogs and poultry are constantly running over the ground, the trees seldom fail of a crop, which is the best proof that manure is necessary. Any manure will suit an orchard; but the sweepings of cow-houses, hog-pens, slaughter-houses, poultry and pigeon-houses, emptying of drains, &c. are more disposed to facilitate the growth of fruit-trees than stable-manure. However, any kind of manure is better than none at all."

"Hog-dung is accounted to have a peculiar virtue in in vigorating weak trees. Rotted turf, or any vegetable refuse, is a general manure, excellent for all soils not already too rich. For an exhausted soil, where a fruit-tree, which has been an old, profitable occupant, is wished to be continued, a dressing of animal matter is a powerful restorative; such as hogs' or bullocks' blood, offal from the slaughter-house, refuse of skins and leather, decomposed carrion; also urine diluted with water. In a soil which does not effervesce with acids, a little lime, dug in a spit deep, is beneficial to fruit-trees."—*Abercrombie.*

Distance of trees in an orchard.—"It should be considered, at the time of planting, to what size the trees are likely to grow. And they should be set so far asunder, that their limbs will not be likely to interfere with each other, when they arrive at full growth. In a soil that suits them best they will become largest. Twenty-five feet may be the right distance in some soils; but thirty-five feet will not be too much in the best, or even forty."—*Deane.*

Cropping.—"It is proper to crop the ground among new-planted orchard-trees, for a few years, in order to defray the expense of hoeing and cultivating it; which should be done until the temporary plants are removed, and the whole be sown down to grass. But it is by no means advisable to carry the system of cropping with vegetables to such an excess as is frequently done. If the bare expense of cultivating the ground, and the rent, be paid, by such cropping, it should be considered enough. As the trees begin to produce fruit, begin also to relinquish cropping. When by their productions they defray all expenses, crop no longer.

I consider these as being wholesome rules, both for the trees and their owners."—*Loudon.*

Orchards which are laid down to grass last longest; but it is necessary to keep the ground clear of weeds and grass, for some little distance from the roots. They may be pastured with calves and swine, and by the latter with much advantage, as they destroy the curculio, (see p. 175.) Sheep may be admitted, provided the trees are smeared with a coat of lime, or with Forsyth's composition; but large cattle, which can reach up to the limbs of the trees, should not be suffered to run in an orchard. In Germany, they surround the roots of fruit-trees in grass-land with hemp-breakings, not only near the stock, but for some distance from the tree. The breakings of flax and spent tan are also recommended for the same purpose.

Mr. Benjamin Wheeler, of Framingham, Mass., gives the following prescription of a wash for fruit-trees, which has been repeatedly tested, and found very useful :—"Dissolve two pounds of potash, of the first quality, in seven quarts of water, for the bodies of the trees. If the limbs are covered with moss or lice, I take a painter's brush, and apply the solution to the moss, &c., with care not to touch the leaves or buds. It may be done at any time of the year, when we are most at leisure. Once in from two to four years is generally sufficient. I have no general rule, however, but wash them as often as they appear to need it, which is always when the bark is not smooth."

PARSLEY.—*Apium petroselinum.*—The parsley is a hardy biennial, a native of Sardinia. The varieties, according to Loudon, are,

The common, plain-leaved, (*seldom cultivated*;)
The curled or thick-leaved, (*most esteemed*;)
The broad-leaved, or large-rooted Hamburgh, (*cultivated for its carrot-shaped root.*)

Mr. Russell's Catalogue mentions the following kinds:

Curled or double—*Apium petroselinum crispum*;
Dwarf curled, (*very much curled,*) *do. do.*
Hamburgh, or large-rooted, do. var. *tuberosum*;
Siberian, (*very hardy, single-leafed, and of fine flavour.*)

and adds, "sown from April to August. Parsley seldom vegetates under five weeks after sowing. It is recommended to soak the seed twelve hours in water mixed with sulphur. This process, with attentive watering, will cause the seed to vegetate in less than a fortnight." The seed should be fresh Loudon says, two years' old seed will not grow.

Culture of the pot-herb kinds.—" One sowing in spring will mostly furnish young leaves all the year; though, to answer a constant demand, many persons make successive sowings from February [in Great Britain] to May. Some also sow early in autumn for young parsley in winter and spring; but such a supply is better provided by cutting down established plants. Sow in a single drill along the edge of any compartment, or occasionally in rows nine or twelve inches asunder. Draw small drills, something less than an inch deep; in which drop the seed moderately thick, and cover a little above half an inch. The plants will come up in three or four weeks, and, when two or three inches high, may be gathered as wanted, all the summer, winter, and following spring till May, when they will go to seed. Have always a young crop sowed timely in the spring to succeed the declining old plants. In gathering pot-herb parsley, cut close and regular. In summer, when the plants grow rank, yielding more leaves than can be used, cut them close to the bottom, and they will shoot up stocky, and in a regular, close growth. Observe also to do the same in autumn, about the end of September, that the plants may form heads of fresh young leaves before winter. On the approach of frosty weather, protect them with haum," straw, or any thing else, which will serve for a defence against cold.

Culture of Hamburgh parsley.—" To obtain large roots, allot a compartment where the soil is deep, and has been well digged. Any common mould will suit, if dry and not too rich. Sow in February, [soon as the frost is well out of the ground,] March, or early in April, in one or more beds, either in drills nine inches asunder, or broad-cast, and rake in. The plants should be thinned to nine inches distance, to give room for proper growth in the roots; for use in August, September, October, and thence till the following spring. On the approach of frost, take up some roots, and preserve them in sand. A sowing may be made the third week in June, where young roots are wanted in winter."

The Siberian, or single-leafed parsley, is cultivated in fields. It may be sown very early with oats or other spring grain, mixed with grass seed.—*See Encyc. of Agr.* parag. 5081.

Uses—This herb is much used and highly valued for culinary purposes as a pot-herb, for garnishes, &c. The Hamburgh parsley is esteemed for its large, carrot-like root, drawn in autumn and winter for the table. In field cultivation it is said to be a preservative from rot in sheep, and efficacious in curing greasy and surfeited horses, &c.—See *New England Farmer*, vol. vi. page 182.

PARSNEP.—*Pastinaca sativa.*—Loudon observes, that "There is only one variety of the parsnep in general cultivation in Great Britain, but the French possess three—the *Coquaine*, the *Lisbonaise*, and the *Siam*. The *Coquaine*, Dr. Maculloch informs us, (*Caled. Hort. Mem.* vol. 1, p. 408,) is much cultivated in Guernsey and Jersey. The roots run sometimes four feet deep, and are rarely so small in circumference as six inches, having been known to reach sixteen. The leaves of this variety grow to a considerable height, and proceed from the whole crown of the root. The *Lisbonaise* does not extend to so great a depth as the *Coquaine;* but the root is equally good in quality, and what is lost in length is gained in thickness. The leaves are small and short, and only proceed from the centre of the crown. The *Siam* has a root of a yellowish colour, not very large, but tender, and more rich in taste than the other varieties."

Soil.—The soil should be light, deep, and free from stones. It should be dug or trenched before sowing, one good spade deep, at least, (some writers say two spades deep,) being careful to pulverize the soil thoroughly, that the roots may have no obstruction to prevent their running down long and straight. If the soil be proper for them, it is said they will not require much manure; and what is used should be perfectly decomposed, or, if recent, be deposited at the bottom of the trench. They do not impoverish the soil, but, like onions, may be raised many years in the same spot.

Seed estimate, and sowing.—Sow as early as the ground is thawed, if not too wet. Deane observed, that "some sow them in the fall; but that is not a good practice, because the ground will grow too close and stiff for want of stirring in the spring; which cannot well be performed in gardens, without danger of injuring the roots. And weeds will be more apt to abound among them if they be sown in autumn." Loudon says, "For a bed five feet by twenty, the plants to remain thinned to eight inches' distance, half an ounce of seed is the usual proportion." Deane recommends sowing them in rows across beds, fifteen inches apart, and to allow six inches from plant to plant at the last thinning, which may be early, as they are not often hurt by insects.

Culture.—When the plants are about one, two or three inches high, in May or June, let them be thinned and cleared from weeds either by hand or small hoeing. Keep them afterwards clear from weeds, till the leaves cover the ground, after which no further culture will be required. Parsneps will continue growing till the frosts are very severe, and are not good for use till they have become ripe, late in autumn. Any thing which is to be used early in the season may be sown with parsneps, such as carrots to draw young, radishes, lettuces, &c.

Preserving during winter.—The parsnep is not so liable as the carrot to be hurt by frost if left in the ground, and some let them remain where they grew through winter. But the best way is to dig them some time in November. They should not be wounded nor bruised in digging; neither should the tops be cut off very close to the roots, nor any of the lateral roots cut off. In either case the roots will rot or become bitter. "Many lose their parsneps, or make them sprout, by putting them in a warm cellar. It is better to keep them in some out-house, or in a cellar that freezes; for no degree of frost ever hurts them. But to prevent their drying too much, it is best to cover them with dry sods, or else bury them in sand that has no moisture in it. Beach sand is improper, because the salt in it will make them vegetate."—*Deane.*

Field culture of parsneps.—In giving an account of the agriculture of the island of Jersey, an English writer says, "Parsneps are grown by every farmer, and either by the spade culture alone, by the plough and spade, or by the small and great plough: any soil in good heart and tilth suits them, but peculiarly a deep loam; and in the same spot, generally, are raised beans, peas, cabbage, and, occasionally, potatoes.

"When the ploughing or digging is completed, the field is once harrowed; straight lines are then drawn across, by means of a gardener's rake, usually from north to south; women then proceed with dibbles, and set the beans in rows, at a distance of four inches, or five inches, from bean to bean, in four, three, and sometimes two ranks of beans, leaving intervals of between five and six feet between each of the sown rows. In the use of the dibble, and in dropping the beans the women have acquired considerable dexterity. In many instances they are followed by children, who drop into each hole made by the dibble, after the bean, three or four peas; the parsnep seed is then sown at the rate of one third to one half of a bushel to the acre." —*Quayle's General View of the Norman Islands.*

Use.—The writer above quoted asserts, that, in the island of Jersey, parsnep "is eaten with meat, with milk, and with butter; but not, as is the common mode of using it as human food in England, with salt fish, or, as in Ireland, together with potatoes.

"The next most valuable application of this root is hog-feeding. At first it is given to the animal in a raw state, afterwards boiled or steamed, and finally, for a week or fortnight, with bean and oat-meal. A hog treated in this way is sufficiently fatted for killing in about six weeks. Its flesh is held superior to that arising from any other food, and does not waste in boiling.

"Bullocks are also fatted with parsneps in about three months; their flesh is here considered of superior flavour to any other beef, and commands, on that account, an additional half-penny in the pound on the price. To milch cows they are also usually given; on this diet, the cream assumes a yellow colour. By the accounts here given, it appears, in proportion to the milk, to be more abundant, than when the animal is kept on any other food whatever. When the cow receives at the rate of thirty-five pounds per day, with hay, seven quarts, ale measure, of the milk produce seventeen ounces of butter. It is generally allowed that the flavour of the butter is superior to any other produced in winter.

"Geese are sometimes shut up with the hogs to fatten on parsneps, which they will eat raw. The root is also given boiled; and for a week before killing they are fed with oats or barley only. Horses eat this root greedily; but in this island it is never given them, as it is alleged that, fed on this food, their eyes are injured. About Morlais, horses are not only ordinarily fed on parsneps, but they are considered as the best of all food, superior even to oats."

To save seed.—Transplant some of the best roots as early as the frost will permit in the spring, two feet asunder, inserted over the crown. They will produce seed plentifully in autumn.

PEA.—*Pisum sativum.*—The pea is a hardy annual, a native of the south of Europe, cultivated in Great Britain from time immemorial, and in this country from its first settlement.

Varieties.—These are numerous: those mentioned in Mr. Russell's Catalogue are,

Early Washington, or true May Pea, (*extra early and fine—grows to the height of two and a half feet*;)
Early double-blossomed, frame, (*early and fine—three feet*;)
Early frame, (*two and a half feet*;)
Early golden Hotspur, (*three feet*,)
Early Charlton, (*three feet*;)
Dwarf blue imperial, (*two feet, a superior variety*;)
Dwarf blue Prussian, (*two and a half feet*;)
Dwarf Spanish, or fan, (*one foot*;)
Dwarf marrowfat, (*three and a half feet*;)
Dwarf sugar, (*pods eaten—three feet*
Matchless, or true tall marrowfat (*six feet*;)
Knight's tall marrows;
Tall, crooked podded sugar, (*pods eaten—six feet*;)
Ladies' finger marrows, (*a prodigious bearer, and delicate eating pea*;)
New nonpareil pea, (*a new and productive sort from Scotland*;)
Knight's dwarf marrows.

"The Charltons are not only very early, but great bearers, and excellent peas for the table; and are therefore equally well fitted for the early and forward succession crops, and inferior to few even for the main summer crops. The frame pea may indeed be raised without the assistance of heat for a forward crop, and, if a genuine sort, will fruit a few days sooner than the Charlton; but it grows low, and bears scantily. The Hotspur is hardy and prolific, and makes returns nearly as quick as the Charlton, and about a fortnight before the marrowfat. The sorts already specified, therefore, embrace the best for sowings made from the end of October till the middle of January, and for late crops, raised between the middle of June and the beginning of August. The Charltons and Hotspur may be sown in May for late fall crops; in June for a smaller supply; and in July along with the frames for the last returns."—*Loudon.*

Times of sowing.—"The dwarfs are generally employed in hot-bed culture, which, however, succeeds badly, and is neither worth preserving nor describing, and the less so, as early crops may be more certainly had by sowing in the fall, in sheltered situations, and covering during the winter with a layer of leaves, and another of long stable-litter loosely applied to keep the leaves in their places. After the earth takes a temperature favourable to vegetation, your pea sowings should be made once a fortnight, to keep up a regular and successive supply."—*Armstrong.*

Quantity of seed.—"Of the small, early kinds, one pint will sow a row of twenty yards; for the larger sorts, for main crops, the same measure will sow a row of thirty-three yards."

Process in sowing.—"For early sorts, make the drills one inch and a half deep; and let parallel drills be two feet and a half, three or four feet asunder. Peas that are to grow without sticks require the least room. For summer crops and large sorts, make the drills two inches deep, and four, five or six feet asunder. As to the distances along the drill, distribute the peas according to their size, and the season: the frame, three in the space of an inch; the Charltons, Hotspur, and dwarf marrowfat, two in an inch; the Prussian blue, and middle-sized sorts, three in two inches; the large marrowfat and Knight's a full inch apart; the moratto, rouncivals, and most larger sorts, an inch and a half apart, and the Patagonian, two inches."

Soil and situation.—"The soil should be moderately rich, and the deeper and stronger for the lofty growers. Peas are not assisted, but hurt, by unreduced dung recently turned in. A fresh, sandy loam, or road-stuff, and a little decomposed vegetable matter, is the best manure. The soil for the early crops should be very dry, and rendered so, where the ground is moist, by mixing sand with the earth of the drills."—*Loudon.*

Armstrong says, "A loose and warm soil is most favourable to this vegetable, which, by the way, is neither improved in quality nor quantity by stable manure. The soil of Clichy, and of Point de Jour des Colombe, &c. in the neighbourhood of Paris, is a pure sand, principally devoted to pea crops, and yielding these most abundantly without the application of dung new or old."

Subsequent culture.—"As the plants rise from half an inch high to two or three inches, begin to draw earth to the stems, doing this when the ground is in a dry state, and earthing gradually higher as the stems ascend. At the same time, with the hoe, loosen the ground between the young plants, and cut down rising weeds. Early crops should be protected during hard frosts by dry straw, or other light litter, laid upon sticks or brush wood; but remove the covering as soon as the weather turns mild. If, in April, May, and the course of the summer, dry weather occurs, watering will be necessary, especially to plants in blossom and swelling the fruit; and this trouble will be repaid in the produce. Rows partly cut off may be made up by transplanting. In dry weather, water, and in hot weather, shade, until the plants strike. All peas fruit better for sticking, and continue longer productive, especially the larger sorts. Stick the plants, when from six to twelve inches high, as soon as they begin to vine. Provide branchy sticks of such a height as the sort will require: for the frame and Leadman's dwarf, three feet high; for the Charlton and middle-sized, four or five feet; for the marrowfat and larger kinds, six or eight feet; for the rouncival, and for Knight's marrow-pea, nine or ten feet. Place a row of sticks to each line of peas, on the most sunny side, east or south, that the attraction of the sun may incline the plants towards the sticks. Place about half the number on the opposite side, and let both rows stand rather wider at top than at the ground. Some gardeners stop the leading shoot of the most early crop, when in blossom; a device which accelerates the setting and maturity of the fruit.

To forward an early crop.—"Sow or plant in lines from east to west, and stick a row of spruce-fir [or other evergreen] branches along the north side of every row, and sloping so as to bend over the plants, at one foot or eighteen inches from the ground. As the plants advance in height, vary the position of the branches, so as they may always protect them from perpendicular cold or rain, and yet leave them open to the full influence of the spring sun. Some cover during nights, and in severe weather with two boards, nailed together lengthwise, at right angles, which forms a very secure and easily-managed covering, but excludes light. A better plan would be to glaze one of the sides, to be kept to the south, and to manage such row-glasses, as they might be called, when over peas, beans, spinage, &c., as hand-glasses are managed, when over cauliflower; that is, to take them off in fine weather, or raise them constantly or occasionally by brick-bats, or other props, as the weather and the state of the crop might require."—*Loudon.*

Management of a late crop.—The best variety for this purpose is Knight's marrow-pea, which may be sown at intervals of ten days, from the beginning to the end of June. "The ground is dug over in the usual way, and the spaces to be occupied by the future rows of peas are well soaked with water. The mould upon each side is then collected so as to form ridges seven or eight inches above the previous level of the ground, and these ridges are well watered. The seeds are now sown in single rows, along the tops of the ridges. The plants grow vigorously, owing to the depth of soil and abundant moisture. If dry weather at any time set in, water is applied profusely once a week. In this way, the plants continue green and vigorous, resisting mildew, and yielding fruit till subdued by frost."—*Hort Trans.* vol. ii.

To save seed.—"Like other vegetables, the pea is susceptible of considerable improvement, and by the simple means of marking the finest plants of each variety, and keeping them for seed. Wilson's frame, and the Knight pea, have been formed in this way, and afford sufficient proof of the *wonders* produced by a very small degree of observation and care."—*Armstrong.*

Field-culture of the pea.—The most common mode of sowing peas is broad-cast; but the advantages of the row culture, in a crop so early committed to the ground, must be obvious. Loudon says, "In Kent, where immense quantities of peas are raised, both for gathering green, and for selling ripe to the seedsmen, they are generally sown in rows from eighteen inches to three feet asunder, according to the kind, and well cultivated between. Peas, laid a foot below the surface, will vegetate; but the most approved depth is six inches in light soil, and four inches in clay soil, for which reason they ought to be sown under furrow, when the ploughing is delayed till spring. Of all grain, beans excepted, they are in the least danger of being buried too deep."—*Loudon.*

Deane observed, that "For field-peas, land that is newly ploughed out of sward is generally accounted best; and land which is high and dry, and has not been much dunged. A light, loamy soil is most suitable for them; and if it abound with slaty stones, it is the better. But they will do in any dry soil. The manures that suit peas best, are marl and lime. Our farmers do not commonly allow a sufficient quantity of seed for peas, in broad-cast sowing. When peas are sowed thin, the plants will lie on the ground, and perhaps rot: when they are thick, the plants will hold each other up with their tendrils, forming a continued web, and will have more benefit of the air.

Insects and diseases.—The *Mass. Agricultural Repository*, for June, 1822, contains some remarks of the Hon. T. Pickering, relative to a bug or fly, (*bruchus pisi,*) which preys on the pea, in which he observes, that an effectual remedy for this evil is *late sowing;* but the hot sun of June will so pinch the vines of the late sown peas, that the crop will be small, unless the land be moist as well as rich. He then details some experiments, by which he concludes that this insect is limited to a certain period for depositing its eggs and if the tender pods are not found till that period has passed, the peas will be free from bugs. Col. Worthington, of Rensellaer county, N. Y., "sowed his peas on the 10th of June, six years in succession, and a bug has never been seen in his peas. Whereas his neighbours, who have not adopted this practice, have scarcely a pea without a bug in it. He supposes the season for depositing the egg of the pea-bug is passed before the peas are in flower."—*Mem. of N. Y. Board of Agriculture*, vol. ii. p. 23. "The only insect that commonly injures our peas is a small brown bug or fly, the egg [or larva] of which is deposited in them when they are young, and the pods easily perforated. The insect does not come out of its nest till he is furnished with short wings. They diminish the peas in which they lodge nearly one half, and their leavings are fit only for the food of swine. The bugs, however, will be all gone out if you keep them to the following autumn. But they who eat buggy peas the winter after they are raised, must run the venture of eating the insects."—*Deane's N. E. Farmer*. The same writer recommends, when seed-peas are known or suspected to contain insects, to scald them a quarter of a minute in boiling water, spread them about, and sow them without delay. If any of the bugs should be in the peas, this scalding will destroy them; and the peas, instead of being hurt, will come up the sooner, and grow the faster.

Mildew is another evil attending peas, especially such as are sown late in the season. This disorder is supposed by Knight to be caused by "a *want* of a sufficient supply of moisture from the soil, with *excess* of humidity in the air, particularly if the plants be exposed to a temperature below that to which they have been accustomed." The remedy which he recommends is, to "give water rather profusely once a week, or nine days, even if the weather proves showery."—See *N. E. Farmer*, vol. i. p. 414.

Use.—The use of peas for soups, and other culinary purposes, is well known. They are likewise very serviceable in fattening hogs, for which purpose they should be harvested dry, and ground into meal. If the straw be forward in autumn, and has been harvested without injury, it will be little inferior to ordinary hay for feeding cattle.

"In boiling split peas, some samples, without reference to variety, fall or moulder down freely into pulp, while others continue to maintain their form. The former are called *boilers*. This property of boiling depends on the soil: stiff land, or sandy land that has been limed or marled, uniformly produces peas that will not melt in boiling, no matter what the variety may be."—*Loudon.*

"When peas are sown before winter, or early in spring, they are very apt to be eaten by mice. To prevent this, soak the peas, for a day or two, in train oil, before you sow them, which will encourage their vegetation, and render them so obnoxious to the mice that they will not eat them."—*Domestic Encyclopedia.*

PEACH-TREE.—*Amygdalus Persica.*—The peach-tree is a native of Asia, and was first brought to Rome during the reign of the emperor Claudius.

Varieties.—Linnæus divides the *A. Persica* into two varieties; that with downy fruit, or the peach, and that with smooth fruit, or the nectarine. There are various instances on record, (*Hort. Trans.* vol. i. p. 103,) of both fruits growing on the same tree, even on the same branch; and one case has occurred of a single fruit partaking of the nature of both. *See further*, FRUIT.

All the varieties are continued by budding, and, as in all other cases, new ones are obtained by sowing the stones; in doing which, we ought not to forget, that, like oil-giving seeds in general, those of the peach require to be earthed as soon as they are separated from the pulp. In their second year, (if wall-trees are required,) such of them as are destined for stems are budded close to the earth; and if riders or standards are wanted, three, four, or six feet higher. In the spring following, the first shoots from these buds should be headed down to four, five, or six eyes, for the purpose of producing two upright and leading branches, and as many laterals, with which you begin to give to the head the form you intend it shall ultimately take.

"The standard is nearly the natural form of the tree; requiring no interposition of art, if we except the removal of dead, or dying, or superfluous limbs, and an occasional supply of wood, (if this be wanted,) to keep up a well-balanced head. It is also that form in which the tree succeeds best in hot climates; and in such it ought always to be employed. But, in northern latitudes, (where the heat is neither long continued nor great,) the fruit of the standard peach-tree is rarely seen in perfection; it may be large, and juicy, and well coloured, but it will always be deficient in that peculiar flavour, that aroma, which is its true characteristic, and without which it is but ordinary fruit. To supply, therefore, as far as may be possible, without the aid of fire or glass, that high temperature in which the peach delights, we must recur, first, to the use of walls, which, besides protecting the tree from high and cold winds, concentrate the rays of the sun on its stem and branches, and on the earth which surrounds and nourishes its roots; second, to the amelioration of the soil, by giving to it both warmth and dryness, should it be deficient in these qualities; and, third, to the mode of training, which exposes to the light the greatest surface of leaf in the shortest space of time, and, consequently, best promotes an equal distribution of the sap. For accomplishing these three objects, the rules are, to construct your walls of stone, or brick, or wood, and of a height from twelve to fifteen feet; to lay out on the eastern and southern sides a border ten feet wide, worked to the depth of three feet, and manured with a mixture of ashes and peat, or bog earth; to plant in this (two and a half feet distant from the wall) your young trees, furnished with two leading branches, and presenting a figure not unlike the letter Y; to bring down those branches to a position nearly horizontal, and subsequently to train them upwards, parallel to each other, as high as the top of the wall, and directly against its side, to which, throughout their whole length, they are to be fastened by woollen straps; and, lastly, to encourage side shoots from these leaders, so as to fill up with bearing wood the intermediate space between them, and such exterior space on the wall as may be thought proper and practicable. To this form is given the technical name of the *wavy* or *curvilineal fan*, and it is obvious, that, in preserving, as well as producing it, the use of the knife cannot be dispensed with. Be careful, therefore, in May and June, and, occasionally, in the succeeding months, to remove water-shoots, and all ill-placed, redundant and diseased buds; and, again, at the fall of the leaf, to cut away, with a sharp knife, and close to the branches on which they grow, such new shoots as will not readily accommodate themselves to your design, or as may be unnecessary to it, and also all such old wood as may be useless or troublesome.

"The general rules for thinning leaves and fruit must be carefully observed in the treatment of peach-trees and nectarines, as they are known to have an uncommon degree of proneness to overbearing, and as the discipline we recommend will, besides giving an improved fruit, tend directly and greatly to fortify the trees against the attacks of their numerous enemies. Of these, the *acarus*, *chermes*, *aphis* and *thrips*, (an insect hardly perceptible to the naked eye,) are the most common, and are best expelled by water and tobacco smoke. It is, however, the curculio, or grub, (as we call it,) that may, from its pre-eminence in mischief, be regarded as the destroyer of the peach. Its attacks, ordinarily, begin in the stem, near the surface of the earth; and, if not arrested, will soon terminate in the roots, where it riots on the gum exuding from the wounds it inflicts. The remedies resorted to in this case are, first, the application of boiling water to the roots; second, a similar application of unslaked lime, in the proportion of one quart to a tree; third, removing the surface earth, and substituting for it tanners' bark; fourth, removing the earth, as in the preceding case in the month of November, and exposing the roots to the action of frost during the winter; and, fifth, encircling the lower part of the stem with straw, and thus compelling the insect to begin his attack so far from the ground, that he will be unable to avail himself of its shelter before the coming on of winter.

"The diseases of the peach-tree are as numerous, and often as fatal, as the depredators just mentioned; and are known to horticulturists under the names of the honey-dew, mildew, canker, spots, &c. The first of these yields to the flour of sulphur, sprinkled over the tree; but the most efficient cure for all of them is the removal of the soil about their roots."—*Armstrong's Treatise on Gardening.*

The following is from the *Domestic Encyclopedia*, last Philadelphia edition:—

"Peach-trees are liable to three casualties:

"1. The fly that deposits eggs near the root, and there forms a worm.

"2. The bursting of the bark by severe frosts in wet winters.

"3. The splitting of the limbs at the fork of the tree.

"The fly, which is blue, (but not a wasp,) begins its attacks about the middle of July, and continues its depredations until the middle of September. It wounds the tender part of the bark, and *generally* at the surface of the ground, there depositing its eggs, which hatch into worms, that prey upon the mucilage and tender part of the bark, until the communication between the root and the branches is cut off, causing the death of the tree. To guard against this, raise a little hillock in the month of June, round the tree, about a foot high, so as completely to cover that part of the bark kept moist and tender at the surface of the ground. This hillock will not stand so long at one height, as to tender the bark above, as the rain will gradually wash it down level with the surface; and it must be raised again every summer.

" To take out the worm, the roots must be uncovered, and the spot looked for where the gum oozes out, following the cavity round with the point of a knife, till you come to the solid wood, and lay the whole open: the worm will be found with a white body and black head; which must be destroyed, and the holes carefully filled up with cow manure, rendered adhesive by sand, or lime and ashes, as directed by Forsyth.

" Soap-suds, heated after a family wash, and poured on the roots of trees about the middle of August, have been used with success in destroying the eggs or the young worm.

" 'According to Mr. John Ellis, of New Jersey, the injury arising from the worm may be prevented in the following way:

" In the spring, when the blossoms are out, clear away the dirt, so as to expose the root of the tree, to the depth of three inches; surround the tree with straw about three feet long, applied lengthwise, so that it may have a covering one inch thick, which extends to the bottom of the hole, the but-ends of the straw resting on the ground at the bottom; bind this straw round the tree with three bands, one near the top, one at the middle, and the third at the surface of the earth; then fill up the hole at the root with earth, and press it closely round the straw. When the white frosts appear, the straw should be removed, and the tree remain uncovered, until the blossoms put out in the spring.

" 'By this process, the fly is prevented from depositing its egg within three feet of the root; and, although it may place the egg above that distance, the worm travels so slow that it cannot reach the ground before frost, and therefore is killed before it is able to injure the tree.

" 'The truth of the principle is proved by the following fact. I practised this method with a large number of peach-trees, and they flourished remarkably without any appearance of the worm for several years, when I was induced to discontinue the straw with about twenty of them. *All those which were without the straw have declined, while* *the others, which have had the straw, continue as vigorous as ever.'*[*]

"To guard against frost, plant the trees where the water will run off, and procure the sweetest and richest fruit, as the inferior qualities are more injured by the cold.

"The splitting of the tree at the forks is guarded against by preserving as many upright branches as can be spared, by breaking off, in bearing years, more than half the quantity of fruit while small, and by pruning almost the whole of every branch beyond where the fruit is set, leaving only a few buds on each of the succeeding year's fruit. The size of the fruit is by these means rendered larger, more beautiful, and of a higher flavour, and the growth of the tree is rendered more vigorous.

"Mr. Thomas Coulter, of Bedford county, Penn., asserts that 'The principal causes of peach-trees dying while young are the planting, transplanting and pruning the same stock; which causes the stock to be open and tender, and the bark of the tree very rough: this roughness of the bark gives opportunities to insects to lodge and breed in it; and birds search after these insects for their support, and with their sharp bills wound the stock in many places; from which wound the sap of the tree is drawn out, which congeals, and never fails to kill, or to render the tree useless in a few years. To prevent which, transplant your peach-trees, as young as possible, where you mean them to stand; if in the kernel, so much the better; because, in that case, there will be no check of growth, which always injures peach-trees. Plant peach-trees sixteen feet apart, both ways, except you would wish to take your wagon through the orchard to carry the peaches away; in that case give twenty-four feet distance to every fifth row, one way, after transplanting. You may plough and harrow amongst your peaches for two years, paying no regard to wounding or tearing them, so that you do not take them up by the roots. In the month of March or April, in the third year after transplanting, *cut them all off by the ground;* plough and harrow amongst them as before, taking special care not to wound or tear them in the smallest degree, letting all the sprouts grow, that will grow; cut none away, supposing six or more should come up from the old stump; the young scions will grow up to bearing trees on account of the roots being strong. Let no kind of beasts into a peach-orchard, *hogs excepted*, for fear of wounding the trees; as the least wound will greatly injure the tree, by draining away that substance which is the life thereof: although the tree may live many years, the produce is not so great; neither is the fruit so good. After the old stock is cut away, the third year after transplanting, the sprouts or scions will grow up all round the old stump, from four to six in number; no more will come to maturity than the old stump can support and nourish; the remainder will die before ever they bear fruit. These may be cut away, taking care not to wound any part of any stock, or the bark. The sprouts growing all round the old stump, when loaded with fruit, will bend, and rest on the ground in every direction, without injuring any of them, for many years, all of them being rooted in the ground as though they had been planted. The stocks will remain tough, and the bark smooth, for twenty years and upwards. If any of the sprouts or trees from the old stump should happen to split off, or die, cut them away; they will be supplied from the ground by young trees, so that you will have trees from the same stump for one hundred years, as I believe. I now have trees, thirty-six, twenty, ten, five, and down to one year old, all from the same stump. The young trees, coming up, after any of the old trees split off or die, and are cut away, will bear fruit the second year: but this fruit will not ripen so easily as the fruit on the old trees from the same stem. Three years after the trees are cut off by the ground, they will be sufficiently large and bushy to shade the ground, so as to prevent grass of any kind from matting or binding the surface so as to injure the trees; therefore ploughing is useless, as well as injurious; useless, because nothing can be raised in the orchard, by reason the trees will shade all the ground, or nearly so; injurious, because either the roots, stock, or branches will be wounded; neither is it necessary ever to manure peach-trees, as manured trees will always produce less and worse fruit than trees that are not manured; although by manuring your peach-trees they will grow larger, and look greener and thicker in the boughs, and cause a thicker shade, yet on them will grow very little fruit, and that little will be of a very bad kind—generally looking as green as the leaves, even when ripe, and later than those that have never been manured."*

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[*] Dr. Thacher observes, that "A band of matting, extending about six inches above, and the same beneath the surface of the earth, may be found preferable to straw, as it is easier applied."

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* This assertion is directly contrary to the experience of a gentleman in New Jersey, who has remarkably fine peaches, regularly manures his trees every

Professor Say, of Philadelphia, has given the following scientific description of the peach-insect:—

"*Ægeria exitiosa.*—Male.—Body, steel blue: *antennæ*, hairy on the inner side, black, with a tinge of blue: *palpi* beneath, and basal band of the head above and beneath, pale yellow: *eyes*, black brown: thorax, with two pale yellow longitudinal lines, and a transverse one behind, interrupted above; a spot of the same colour beneath the origin of the wings; *wings*, hyaline, nervures and margin steel blue, more dilated on the costal margin and anastomosing band of the superior wings: *feet coxæ*, two bands on the tibia, including the spines: incisures of the posterior tarsi, and anterior tarsi behind, pale yellow: *abdomen*, with two very narrow, pale yellow bands, of which one is near the base, and the other in the middle: *tail*, fringed, the fringe margined with white each side.—Length, to the tip o' the tail, more than three fourths of an inch.—Length, to the tip of the wings, one tenth of an inch shorter.

Female.—Body, very dark steel blue, with a tinge of purple · *palpi* beneath, black: thorax, immaculate: *inferior wings*, hyaline, with an opaque margin, and longitudinal line; the latter, and the costal margin, are dilated: *tergum*, with the fifth segment bright fulvous.—Length, seven tenths of an inch.

"The pupa has two semifaciæ of spines upon each of the segments, excepting the three terminal ones, which have a single row only.

"The follicle is brown, oblong-oval, and is composed of small pieces of bark and earth, closely connected together by the web of the animal.

"The very great disparity of markings between the sexes of this destructive species, would lead us to hesitate in admitting their identity, if we were not aware that, in this genus, the males and females, in several instances, differ exceedingly from each other. In the present instance, this difference is so great as to render it difficult to construct a specific character which shall distinguish them from all others of the genus. After a careful examination of entomological works, I have not been able to find any notice whatever of this species. I therefore describe it as new."
—*Journal of the Academy of Sciences.*

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year, and asserts that the speedy decay of common peach-trees is owing chiefly to a neglect of the practice. He even said experience convinced him it was owing to the same circumstance that peach-stones did not, in general, produce fruit like the original tree.

Dr. Thaddeus W. Harris has written a paper on this insect, which was published in the *N. E. Farmer*, vol. v. p. 33, and observes, that "One of the first writers who described the peach-tree insect was the late Dr. Benjamin Smith Barton, the celebrated botanist, and professor of natural history in the university of Pennsylvania. In his memoirs on various destructive insects, which obtained the Magellanic premium, in 1806, from the Philosophical Society of Philadelphia, this insect is called *Zygæna Persicæ.*" Dr. Harris also observes, "he" (Dr. Barton) "having first described this insect, the name which he has imposed has the priority, and must be retained."

"This insect," continues Dr. Harris, "I first obtained in the perfect state in July, 1823, and sent a description of it to Hon. John Lowell. It is a remarkable coincidence, that the name which I then gave it is the same as that given by Dr. Barton, although I was then unacquainted with his account of it. I also obtained a specimen of the male from an excrescence on the trunk of a cherry-tree, and have frequently observed the larvæ in those tubercles which deform the limbs of that tree.

"The females deposit their eggs, in the month of August, on the trunk of the peach-tree, near the root; the eggs are soon hatched, and the larvæ immediately penetrate beneath the bark. Some eggs are laid as late as the last of September.

"The precautions which I would recommend are, to remove the earth around the roots, carefully to search it and the trees for any cocoons or larvæ which may exist there, which should be crushed or burned. This operation should be commenced early in this month [August.] Then cover the trunk with the common composition, or wash and surround it with coarse paper, such as is used for sheathing, and which is manufactured from junk, or old cordage. This is to be properly secured by strings of Canton matting, and should extend two or three inches below the surface of the ground, and six or seven inches above it. Mortar may now be placed round the roots, so as to confine the paper, and prevent access beneath it, and the remaining cavity filled with fresh loam. The strings may be removed after the winter commences; in the spring the tree should again be searched for any of the larvæ, which may have escaped at first, and the application of the composition and loam be renewed.

"In getting out the caterpillar, we should be sparing in the use of the knife; a piece of wire will often answer the purpose quite as well, and does not wound the bark."

Mr. Wilson, of New York, in his *Economy of the Kitchen Garden*, &c., a valuable work, lately published, says, "Grafting-clay, applied to the bark of trees, does not injure the circulation, and, if the stems of peach-trees were enveloped with a thin coat of it, I am persuaded no worm could hurt them. If properly prepared and applied, it adheres to the stem, or any other part of a tree, with great tenacity, until expanded and broken by the frosts and thaws of winter. It is made in the following manner:—Take three parts of any kind of clay, free from stones, the stiffer the better, one part of horse-dung, free from straws, and one part of fresh, but not thin, cow-dung; mix and incorporate the whole well together, adding a sufficient quantity of water to render it of a consistency of good, stiff mortar; beat and work it thoroughly with the spade, till it becomes as smooth and tough as putty. It will then be fit for applying round the stem of your tree, and should be neatly clapped on it by the hands."

The same writer attributes the degeneracy of peach-trees, so far as it is real, to the cultivation of old sorts, and observes, that "Budding or grafting from old trees, upon new stocks, raised from seed, although it is the means of affording a fresh supply of vigorous nourishment to the scion of the old sort, which is to form a new tree, is still only a new mode of the continuation of the same individual;" and advises, in substance, either to bud or graft from new sorts, on seedling stocks, or to raise young trees from seedlings, produced from seeds of healthy, young, or middle-aged trees, which are not of a worn-out variety.

Mr. Wilson, moreover, observes, "Great mischief is frequently done by cutting off the tops of peach-trees, when they are first set out. If they are furnished with good heads, as they always ought to be, before they are taken from the nursery, no other pruning should be given them at setting out, except the moderate retrenching of any very irregular shoots, and this should be done at the time the buds begin to expand; and the chief pruning they require afterwards is, to keep their heads moderately open by cutting out such branches as crowd upon or interfere with each other."

Mode of bearing.—"All the varieties of the peach and nectarine bear the fruit upon the young wood of a year old; the blossom buds rising immediately from the eyes of the shoots. The same shoot seldom bears after the first year, except on some casual, small spurs, on the two years' wood, which is not to be counted upon. Hence the trees are to be pruned, as bearing entirely on the shoots of the preceding year; and a full supply of every year's shoots must be trained in for successional bearers.

Thinning the fruit.—"In favourable seasons, the blossoms often set more fruit than they can support, or than have room to attain full growth; and if all were to remain, it would hurt the trees in their future bearing; therefore they should be timely thinned, when of the size of large peas, or half-grown gooseberries. There should be a preparatory thinning at the time of stoning, and a final thinning afterwards, because most plants, especially such as have overborne themselves, drop many fruit at that crisis. Finish the thinning with great regularity, leaving those retained at proper distances, three, four, or five, on strong shoots, two or three on middling, and one or two on the weaker shoots; and never leaving more than one peach at the same eye. The fruit on weakly trees thin more in proportion."—*Abercrombie*

Use.—The use of the peach, as a dessert-fruit of the first order, is too well known to require observation. In several of the Southern States, a sort of brandy is made from this fruit. This liquor, however, though highly flavoured, is said to be unwholesome.

The following mode of drying peaches has been practised by Thomas Belangee, of Egg Harbour, New Jersey :—

He has a small house, with a stove in it, and drawers in the sides of the house, lathed at their bottoms. Each drawer will hold nearly half a bushel of peaches, which should be ripe, and not peeled, but cut in two, and laid on the laths, with their skins downwards, so as to save the juice. On shoving the drawer in, they are soon dried by the hot air of the stove, and laid up. Peaches, thus dried, eat like raisins. With a paring-machine, which may be had for a dollar or two, apples or pears may be pared, and a sufficient quantity dried, to keep a family in pies, and apple-bread and milk, till apples come again. With a paring machine, one person can pare for five or six cutters.

PEAR-TREE.—*Pyrus communis.*—The pear-tree is found in a wild state in Europe as far north as latitude 51°. It grows in almost any soil, and seems to be quite at home in New England. In a dry soil (according to Loudon) it will exist for centuries, and still keep in health, productiveness and vigour.

Propagation.—"The pear may be propagated by layers or suckers, but not easily by cuttings. These modes, however, are productive of very indifferent plants, and are justly rejected in favour of raising from seed, and grafting or budding.

"*From seed.*—This mode is adopted either for the purpose of obtaining new varieties, or for producing pear-stocks. The manner of procuring seedlings is the same as directed for the apple-tree, page 17. Professor Van Mons, proprietor of the *Pépinière de la Fidelité*, at Brussels, has upwards of eight hundred approved sorts of new pears, raised from seed by himself, and M. Duquesne, of Mons, in the course of fifteen or sixteen years, and selected from probably eight thousand new seedling fruits. Van Mons observed to Neill, that he seldom failed in procuring valuable apples from the seed; for those which were not adapted to the garden as dessert-fruit, were probably suited for the orchard, and fit for baking, or cider making. With pears the case was different, many proving so bad as to be unfit for any purpose.—*Horticul. Jour.*, &c. 309. Whenever a seedling indicates, by the blunt shape, thickness, and woolliness of its leaves, or by the softness of its bark and fulness of its buds, the promise of future good qualities as a fruit-bearing tree, Van Mons takes a graft from it, and places it on a well established stock: the value of its fruit is thus much sooner ascertained.—*Horticul. Jour.*, &c. 310. At Brussels, seedlings yield fruit in four or five years; in Britain, seldom before seven or ten years have elapsed. The fruit of the first year of bearing is always inferior to that of the second and third years. If a pear or an apple possess a white and heavy pulp, with juice of rather pungent acidity, it may be expected in the second, third, and subsequent years, greatly to improve in size and flavour. New varieties of pears, and indeed of all fruits, are more likely to be obtained from the seeds of new than of old sorts.—*Horticul. Jour.*, &c. 308, 309.

"As the varieties of the pear do not reproduce themselves from the seed; as the plants furnished by layers, cuttings, and suckers, are very indifferent; and as seedlings are slow in giving their fruit; it follows, that the pear is principally propagated by scions and buds. These are placed on pear or quince stocks, according as taste or interest may invite to early and small crops of fine quality, or to later and more abundant ones of inferior character. In the former case, the stem of the quince must be employed; and in the latter, that of the common pear, and without any material difference in the operation, excepting that 'the feebler the stem, the nearer to the earth should be placed the scion or the bud.'

"Notwithstanding the hardiness ascribed to the pear-tree, we know not any of the kernel class more readily or sensibly affected than it by particular conditions of the atmosphere. A moist and cold spring, a wet summer, and a rainy autumn, are alike unpropitious to it. In either of these cases, the fruit which does not rot is watery and tasteless; and when all take place, the evil extends to even a second year; as, according to the observations of Coursette, 'long continued moisture rarely fails to convert fruit buds into wood buds.'

"The second year after budding or grafting, the plants may be removed to the places where it is intended they shall stand; and as the manner and time of doing this do not differ from those prescribed for the apple-tree, we may spare ourselves and our readers the trouble of a repetition of our directions on those heads.

"With respect to exposition and soil, though the pear-tree may be made to grow any where, still it will succeed badly on the north sides of hills, or in stiff, dry soils, and still worse on those which rest on a wet sub-soil. Some of its later and finer varieties require and deserve a deep substantial loam, occasionally refreshed with a dressing of well rotted dung, and some of the best aspects the garden can furnish.

"Cultivated as standards and pyramids, the young trees should be left, in a great degree, to regulate their own shape,* and if interference become proper at all, it should be conducted—'to keep the middle of the head pretty open, and the sides well balanced.'† Trees of other forms, and intended for walls and espaliers, require more labour and management, and a degree of both summer and winter pruning: the former of which consists in rubbing off all fore-right, ill placed, superfluous, or spongy shoots, before they become so hard as to render the use of the knife necessary; while the latter (performed during any temperate weather between November and April) is conducted on the general rule 'of sparing all such well placed and thriving laterals, as may be necessary for preserving the form given to the head of the tree, and of cutting away all others close to the branch from which they grow.' If the older wood be diseased or redundant, cut this away also, or shorten it down to some healthy and promising shoots. The retained branches, if growing against a wall or trellis, should, after each pruning, be laid down and nailed, with as much extension as can conveniently be given to them.

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* Knight remarks, that, in general, very little pruning is required for pear standards or pyramids; but that there are sorts which form heads resembling those of apple-trees, and that for these pruning may be beneficial.

† To produce a well balanced tree, shorten the wood of the deficient side and leave the other to itself.

"Mr. Knight's mode of training the pear-tree is, to leave on the young stock two lateral branches on each side. When about six feet high, he transplants the tree early in the spring, and inserts grafts on each side of the laterals so that two of them shall push from the stem about four feet from the ground, and two others from the summit, the ensuing year. The shoots produced by these grafts, when about a foot long, are to be trained downward—the lower ones almost perpendicularly, and the upper ones just below a horizontal line; and so placed, as to distance, that the leaves of the one will not at all shade the other. Continue this mode of training the second year, and in the third you may expect an abundant crop of fruit.

"When an old tree becomes unproductive, one of two methods should be adopted—either to cut down within eighteen inches or two feet from the ground, and train up anew some selected shoots which may have pushed from the stump, (which is the method of Forsyth,) or, to take off at its base every branch which does not want at least twenty degrees of being perpendicular, and all spurs from such other branches as by this rule will be left. Into these, (the retained branches,) at their subdivisions, and at different distances from their bases, quite to their extremities, grafts must be carefully inserted; which, when they attain sufficient length, (say twelve inches,) must be trained downward between the branches, as directed in the preceding paragraph."—*Armstrong.*

The diseases of the pear-tree, and the insects which infest it, are in general the same with those to which apple-trees are liable. Soft soap is said to be an excellent application to the stem and limbs, preventing the decline of the tree, and causing the bark to become smooth and glossy. A solution of potash, as recommended for the apple-tree, (page 222,) would no doubt prove equally useful to this tree. Pear-trees have of late years been subject to a malady, by some supposed to be fire-blight, but by others attributed to an insect called *Scolytus pyri*. During the months of June and July, the extreme branches turn black, as if scorched. The disorder extends downwards to the larger limbs, and continues to increase, till, in some instances, the tree is entirely destroyed. It is sometimes so rapid in its progress, that, in a few hours from its first appearance, the whole tree will appear to be mortally diseased, and all its foliage withered or withering. A writer in the *New England Farmer*, vol. ii. p. 42, says, that, on the first appearance, of this disease, "I instantly sawed off all the limbs affected, and proceeded to examine them. I found at last the enemy, not *at the point* where death ensued, but some inches below it. The insect was very small, and apparently incapable of such extensive mischief, but the effect was certain, and the manner of producing that effect was obvious. It had eaten a complete circle of the alburnum, or sap wood, not exceeding the size of a knitting needle, so as completely to intercept the passage of the sap." This insect the writer exhibited to Professor Peck, whence arose his account of it, first published in the *Mass. Agr. Repos.*, and republished, together with a cut of the insect, in the *N. E. Farmer*, vol. v. p. 2. The late Professor Peck observed, that the mischievous effects of this minute insect may be observed in June and July, and that the dead part of the branches should be cut off, and burnt without delay. The writer above referred to says, that, by steadily pursuing the system of cutting off the limbs many inches below the apparent injury, and burning them, the insects have been extirpated from his estate.

Some writers attribute the sudden decay of the pear-tree to the overpowering rays of the sun. Others say that a warm winter sets the sap in motion, which a cold spring arrests, and causes it to stagnate and become corrupt in the pores of the alburnum. Others are of opinion that manuring too high, and pruning too much, causes the tree to die of a *plethora* or *surfeit*. The remedy, however, is not a subject of so much dispute. In all cases of blight, the only cure or palliation of the disorder is found in sawing off the affected branches, some inches below where the blight appears.

Use.—"As a dessert fruit the pear is much esteemed, and generally preferred to the apple. It is also used for baking, *compotes*, marmalade, &c. Pared and dried in the oven, the fruit will keep several years, either with or without sugar. This mode of preparing the pear is about as common in France, as the making of apple-pies is in Britain, and what is favourable to the practice is, that bad eating sorts answer best for drying. The wood of the pear-tree is light, smooth, and compact, and is used by turners, and to make joiners' tools, picture-frames to be dyed black, &c. The leaves will produce a yellow dye, and may be used to give a green to blue cloth."—*Loudon.*

PEPPER, RED.—*Capsicum.*—This plant requires a warm, rich soil, and a favourable exposition. The seeds may be placed in rows, three feet apart, or in hills, at that distance from each other. In dry weather they will need watering, and should be kept clear of weeds by frequent hoeing. The seeds are best preserved by running a string through the pods, and hanging them in a dry place.

Use.—"Pepper is an excellent spice, which should always be coarsely ground, and eaten only with fat, smoked, or tough animal food; with cabbages, cucumbers, and other flatulent and cold vegetables; and likewise with fish, and all substances that are difficult to be digested. On the continent of Europe, this spice is highly esteemed for its efficacy in relieving flatulency, weak, or impaired digestion, and the giddiness which generally accompanies the complaint last mentioned. For this purpose, from six to ten grains are directed to be swallowed every morning, previously to taking food; such practice, however, ought to be adopted only in cases where the stomach is in a high degree vitiated, or the patient has been habituated to the free use of spices and spirituous liquors."—*Dom. Encyc.*

PLUM-TREE.—*Prunus domestica.*—This tree is found growing wild in Great Britain and other parts of Europe; but its native country is supposed, by European writers, to be Syria, in Asia. It is also indigenous in North America, and a wild kind, found in the woods of Vermont, grows large and fair, but its fruit contains little saccharine matter. No doubt it might be improved by culture, and may furnish stocks for grafting. Some of the most approved varieties are enumerated under the head Fruit, p. 136.

Soil and cultivation.—Plums, according to Miller, should have a middling soil, neither too wet and heavy, nor over light and dry. Armstrong recommends argillaceous soils, not very wet nor very dry. "Where, from previous culture, or accidental causes, the earth becomes either very rich or very poor, the tree does not succeed. In the one case, its vigour is directed only to the production of wood and foliage; and in the other, its growth is feeble, and its life short. In favourable climates, it should always be cultivated as a standard, and will then require only a little annual labour about the roots, and the removal from the head of dead or dying branches; but, in northern latitudes, and cold situations, the espalier form, (as practised near Paris,) may be not only useful, but indispensable. This differs in nothing from the ordinary mode, but in pruning *less severely*. The cultivators at Montreuil, instead of shortening the branches to three or four eyes, leave them fifteen or twenty feet long, and lay them down in such a way as shall soonest and most completely enable them to cover the frame to which they are attached.

"With regard to product, '*few* and *fine*' is the general maxim. The thinning discipline must not, therefore, be omitted; because it is that which will best fulfil both parts of the rule."

Diseases.—The gum and canker are the diseases most common to plum-trees, for which, heading down is prescribed as the best remedy. Plum-trees are also annoyed by an insect, described, by Professor Peck, in the *Mass. Agr. Repository* for 1819, and by him denominated *Rynchænus cerasi*. The insect causes tumors, or irregular, black lumps, which deform the bark, and occasion the premature fall, not only of plums, but peaches and apricots. "The evil," according to Professor Peck, "produced by this insect, cannot be wholly remedied; but something may be done to diminish the mischief, by cutting off the diseased branches." They should, according to his directions, be cut off the last half of June, and burnt immediately.

Mr. R. Toohey, gardener, of Waltham, Mass., recommends the following composition for destroying insects, which infest plum-trees:—

"Take of tobacco-juice one gallon, this may be had of the tobacconists, or you may make it, by putting some tobacco in warm water, (not boiling, as that will take off a great part of the oil;) oil of tar, one quart; train oil, one quart; soft soap, one and a half pound; and a quarter of a pound of soot. Beat the oils together first, and then the soap and soot, till well united; then pour them all into the tobacco-juice, stirring them gently together. When the liquid is cold, it is fit for use. It should be applied with a common paint-brush, in the latter end of March, or first of April.

"Previous to applying the mixture, I should recommend pruning, and, when the trees are very much affected with the above-mentioned disease, heading down at *a*, *b*, *c*, *d*, *e*, or *f*, according to the size of the trees; if any of the ulcers should remain after pruning or heading down, they must be entirely removed from the tree, and then apply the composition."—*N. E. Farmer*, vol. vi. p. 274.

POTATO —Sir Joseph Banks (*Hort. Trans.* i. 8) considers that the potato was first brought to Spain from the mountainous parts of South America, in the neighbourhood of Quito. To England, however, this root found its way by a different route, being brought from Virginia by the colonists sent out by Sir Walter Raleigh, in 1586.

Varieties.—These are very numerous, not only from the facility of procuring new sorts by raising them from seed, but because any variety cultivated for a few years, in the same soil and situation, as in the same garden or farm, acquires a peculiarity of character and habit, which distinguishes it from the same variety in a different soil and situation. Dr. Hunter, in his *Georgical Essays*, has supposed the duration of a variety is limited to fourteen years: and Knight concurs with him in opinion. Potatoes, which are excellent in Ireland, Nova Scotia, and other high northern latitudes, do not answer a good purpose in New England. The potato taken from the south prospers better, such as the River Plate, or long red potato, which has succeeded well in Massachusetts. Loudon asserts, that the best mode to order potatoes for seed is, to give a general description of the size, colour, form, and quality wanted, and whether for an early or late crop, without being guided by the names attached to any varieties.

Propagation.—The potato may be propagated from seed, cuttings, or layers of the green shoots, sprouts from the eyes of the tubers, [roots,] or portions of the tubers containing a bud or eye, or by planting the tubers whole. The object of the first method is to procure a new or improved variety; of the second, little more than curiosity, or to multiply, as quickly as possible, a rare sort; and of the third, to save the tubers for food. The methods, by portions of the tubers, [the roots cut in pieces,] or whole potatoes, are the best, and almost universally practised, for the general purposes both of field and garden culture.

By seed.—"Take the apples, in the beginning of October, [or whenever they are ripe,] before the frost has hurt them; hang them up by the foot stalks, in a dry closet, where they will not freeze; let them hang till March, or April; then mash the apples, wash the seeds from the pulp, and dry them in a sunny window. Sow the seeds in a bed about the first of May. When the plants are four or five inches high, transplant them into ground well prepared, one or two plants in a hill."—*Deane*. Seeds from the same ball will produce a great variety of kinds, some of which may be of little value; and in order to make the most of such experiments, it will be well to proceed according to the following directions, extracted from some remarks by Col. Pickering, contained in a pamphlet published by the Essex Agricultural Society, Mass.; this society having awarded premiums for the best potatoes raised from the seed.

1. "Seeing the seeds in the same ball will produce various sorts of potatoes, it will be indispensably necessary, that each young plant grows at the distance of eight or ten inches apart.

2. "In autumn, or as soon as the vines or stems of the plants die, and the young potatoes are dug up, those of each plant are to be saved by themselves, and it will be easy to put each sort in a separate paper bag. Those potatoes will be very small, perhaps from the size of a pigeon's down to a sparrow's egg.

3. "In the ensuing spring, the potatoes of each sort, that is, the potatoes of each bag, must be planted by themselves; and, if not in distinct rows, then stakes, driven into the ground, should mark the divisions of the several sorts in the same rows, leaving a space of about two feet between one sort and another, to guard against any mixture.

4. "In the time for harvesting them in the second year, the potatoes [if grown in a good soil] will be large enough to be boiled, to ascertain their quality. Each sort must be tried by itself. Such as are watery, and ill flavoured, may be at once thrown aside, for the use of live stock. Every other sort, so valuable as to be thought worth cultivating, must be kept unmixed, by putting each kind in a separate bag or cask."—*N. E. Farmer*, vol. vi. p. 286.

The modes of propagating by layers, cuttings of the vines, suckers, sprouts, &c., are rather curious than useful, and are therefore here omitted, but may be seen in detail in the *Encyc. of Gard.* p. 620.

By portions of the tubers, [or cuttings of the roots.]—"In making the sets or sections, reject the extreme or watery end of the tuber, as apt to run too much to haulm, [vine,] and having the eyes small, and in a cluster; reject also the root, or dry end, as more likely to be tardy in growth, and produce the curl. Then divide the middle of the potato, so as to have not more than one good eye in each set. When the potato-scoop [an instrument for digging out the eyes of potatoes] is used, take care to apply it so as the eye or bud may be in the centre of each set, which this instrument produces, of a semi-globular form. The larger the portion of tuber left to each eye, so much the greater will be the progress of the young plants."—*Loudon.*

By some experiments which were made by J. Whitlaw, Esq., and given in detail in the *N. E. Farmer*, vol. i. p. 53, and vol. iv. p. 314, these two important facts were made apparent: 1st. Large potatoes are much better for seed than small ones. 2d. It is best to cut off the but and top-ends from each potato, and cut the middle pieces into quarters, before planting. Knight, the famous English horticulturist, has found, that, for a late crop, small *sets* [seed potatoes] may be used; because the plants of the late varieties always acquire considerable age before they begin to generate tubers; but for an early crop, he recommends the largest tubers; and he has found, that these not only afford very strong plants, but also such as readily recover when injured by frost; for, being fed by a copious reservoir beneath the soil, a re-production of vigorous stems and foliage soon takes place, when those first produced are destroyed by frost or other cause. He adds, "When the planter is anxious to obtain a crop within the least possible time, he will find the position, in which the tubers are placed to vegetate, by no means a point of indifference; for these, being shoots or branches which have grown thick instead of elongating, retain the disposition of branches to propel the sap to their leading buds, or points most distant from the stems of the plants of which they once formed parts. If the tubers be placed with their leading buds upwards, a few very strong and very early shoots will spring from them; but if their position be reversed, many weaker and later shoots will be produced; and not only the earliness, but the quality of the produce, in size, will be much affected."—*Hort. Trans.* iv. p. 448.

M'Mahon advises to cut seed potatoes "a week before planting, in order that the wounds should have time to form a dry crust; for, if planted immediately after being cut, they imbibe too much moisture, many of them rot, and the rest are greatly weakened thereby." Some advise to wet seed potatoes, and roll them in pulverized plaster of Paris, immediately before planting.

From an experiment made by a person in the employ of the Hon. Josiah Quincy, the particulars of which are given in *Mass. Agr. Repos.* vol. v. p. 64, it appears that the product of certain rows, planted with *whole* potatoes, exceeded an equal extent of adjoining rows *more than one third.* A writer for the *N. E. Farmer*, vol. i. p. 330, gives an experiment, which tends to the conclusion that potatoes planted whole produce more than those which are cut. The experiments of most cultivators, however, are in favour of cutting. Dr. Cooper, in the last Philadelphia edition of *Willich's Domestic Encyclopedia*, says, "The best mode [with regard to seed potatoes] appears to be this:—choose your potatoes for planting of a moderate size, rather large than small, for there is no good reason to be assigned for breeding from diminutive parents; cut your potatoes into sets, two eyes to a set; throw away, without hesitation, into the hog-trough, all the inferior and diminutive eyes, choosing your sets from the middle of the potato; do not cut the potato down the middle." Loudon observes, "In preparing the sets of potatoes, some cultivators recommend large sets, others, small potatoes entire. Others, on the ground of experience, are equally strenuous in support of small cuttings, sprouts, shoots, or even only the eyes or buds. With all these different sorts of sets, good crops are stated to have been raised, though tolerable-sized cuttings of pretty large potatoes, with two or three good eyes or buds in each, are probably to be preferred. A very slight exercise of common sense might have saved the advocates of shoots, scooped-out eyes, &c., their experiments and arguments, it being evident, as Brown has observed, to every one that has any practical knowledge of the nature of vegetables, that the strength of the stem in the outset depends, in direct proportion, upon the vigour and power of the set. The set, therefore, ought to be large, rarely smaller than the fourth part of the potato; and, if the root is of small size, one half of the potato may be profitably used. At all events, rather err in giving over-large sets, than in making them too small; because, by the first error, no great loss can be sustained; whereas, by the other, a feeble and late crop may be the consequence." Deane says, "The shooting parts exist, in a potato, in the form of a tree, of which the stock is at the but or root-end. I therefore take care to cut athwart those parts as little as possible: though they will grow any way, the greater length of shooting stem there is in a set, the more strong and vigorous will be its growth at first."

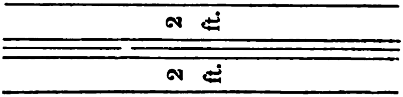
Quantity of sets.—Abercrombie directs, for a plot of the *early* and *secondary crops*, eight feet wide by sixteen in length, planted in rows, fifteen inches asunder by nine inches in the row, a quarter of a peck of roots or cuttings. For *full-timed* and *main crops*, a compartment, twelve feet wide by thirty-two in length, planted in rows, two feet distant, half a peck. For *field cultivation*, English writers say that it requires twenty bushels and a half to plant an acre with cut potatoes; and thirty-seven bushels and a quarter of whole potatoes.

Soil.—"The soil," says Loudon, "in which the potato thrives best, is a light loam, neither too dry nor too moist, but if rich, so much the better.—They may, however, be grown well on many other sorts of land, especially those of the mossy, moory, and other similar kinds, where they are free from stagnant moisture. The best flavoured potatoes are almost always produced from a newly broken-up pasture-ground, not manured; or from any new soil, as the site of a grubbed-up copse or hedge, or the site of old buildings or roads. The best climate for the potato is one rather moist than dry, and temperate or cool rather than hot. Hence the excellence of the Irish potatoes, which grow in a dry, loamy, calcareous soil, and moist and temperate climate; and hence, also, the inferiority of the potatoes of France, Spain, Italy, and even Germany. In short, the potato is grown no where in the world to the same degree of perfection as in Ireland and Lancashire, and not even in the south of England, so well as in Scotland and the north and western counties; all which is, in our opinion, clearly attributable to the climate."

Although a *light* loam is a proper soil for the potato in a cool and moist climate, a strong and *heavy* loam is most suitable for the same root in a dry and hot climate. In a paper read before the New York Horticultural Society, in 1823, by Wm. Wilson, an experienced horticulturist, are the following remarks on this subject:—"Those soils which prove the very bane of the potato here [in the United States] are just such as prove the most congenial for them in Britain. And so, on the contrary, the best soils, by far, for producing the driest and best flavoured potatoes here, and altogether the most abundant crops, are those of a strong, heavy loam." These assertions are corroborated by a number of experiments, mentioned in the paper from which they are extracted. Mr. Buel, of Albany, likewise asserts, that "the best potatoes are grown upon cold, moist, but porous and rich soils."—*Am. Farmer*, vol. ix. p. 409.

Methods of planting.—These are various. If the land is rough, hard, or stony, the common mode of planting in hills is, perhaps, the most expedient. But, if it be somewhat mellow, drills are to be preferred. Dr. Cooper says, "If your soil is stiff and wet, plough it in ridges; if sandy and dry, plough it flat. Plough it deep. Plant your sets in drills marked out by the plough or the hoe. The plants should be dibbled in, six inches deep, on long dung, scattered not sparingly along the drills, then covered with about four inches of mould.

The drills should be in threes ≡ one foot apart; the plants should be eight inches apart, with an interval, on each side of each set of three drills, of two feet, which will admit of horse-hoeing between the sets of drills. and of hand-weeding between each drill.



To have a good crop, you must not spare dung, or spare labour in weeding. Some persons prefer sets of four or five drills, instead of three; or, where horse-hoeing is not convenient, the intervals may be reduced to one foot between each set of drills, for the convenience of hand-weeding; but, upon the whole, the method here first proposed is as good as any. Forty loads of dung per acre will pay better than a less quantity.

"If small potatoes are wanted for feeding, the sets may be at six inches apart, and the rows at nine inches; but the method first here proposed admits, what is essential, accurate weeding, and sufficient air to circulate between the plants."

Deane says, the sets may be either in single rows, three feet, or double, one foot apart, and from seven to nine inches asunder in the rows.

"An expeditious way of planting potatoes is as follows After the ground is prepared, by ploughing and harrowing, cut furrows, with the horse-plough, forty inches apart; drop the sets in the furrows; then pass the plough along the back of each furrow, which will throw the earth of both furrows upon the sets; and afterwards level the ground with the back of the harrow, or with a harrow that has short tines; but it is of no great consequence whether it be levelled at all. Another method of planting is, to plough the ground plain, keeping the furrows straight and regular, and drop sets in every third or fourth furrow. But, before this is done, the ground should be ploughed and made level and fine with the harrow."

A writer for the *N. E. Farmer*, vol. ii. p. 331, gives the following as "an easy and cheap method of raising potatoes: On an even and smooth piece of mowing, or pasture land, make deep, single furrows, with a plough, at three feet distance. Fill these furrows with rye [or any other] straw, and drop your potatoes six or eight inches apart, on the straw. Then, with a hoe, cover the potatoes by turning down the ploughed furrows upon them. They will require no more attention till they are grown. No hoeing will be necessary. The same land may be improved as a pasture for sheep, as those animals will not eat, nor materially injure, the tops of the potatoes."

The *after-culture* of potatoes consists in harrowing, hoeing, weeding, and earthing up. All potatoes require to be earthed up; that is, to have at least one inch in depth of earth heaped on their roots, and extending six or eight inches round their stem. The reason is, that the tubers do not, properly speaking, grow under the soil, but rather on, or just partially *bedded* in its surface. Potatoes should, generally, be hoed three times, though twice will do in ground not infested with weeds. The last hoeing should be finished before the plants are in blossom; otherwise the plants will be apt to form a second set of roots, which will not have time to come to maturity, but will rob those first formed of their nourishment. If weeds are prevalent, they should be cut up or pulled out, but the plants should not be earthed up in that stage cf their growth. Plaster of Paris, well pulverized, and applied to the leaves, has a beneficial effect on potatoes.

Pinching off the blossoms.—It is now generally admitted, that a certain advantage, in point of produce, is obtained by pinching off the blossoms as they appear on the plants. The fact has been repeatedly proved, and satisfactorily accounted for, by Knight, who imagines that it will add an ounce in weight to the tubers of each plant, or considerably above a ton per acre.

Gathering the crop.—It is believed that cultivators are apt to err by gathering their potatoes too early. The roots continue to grow larger and better after the tops have attained their full growth. The Hon. O. Fiske, of Worcester, in an address to the Worcester Agricultural Society, says, "Nature has not accomplished its maturation at the period when the vines decay, and the farmer believes it to be ripe. It seems probable that the earth, by some unknown process, perfects its qualities after it has attained its growth. That potatoes, which have remained the whole season in the earth are more farinaceous, has been ascertained." It may be stated, as a general rule, that potatoes succeed best when planted early and dug late. But it is most advisable to harvest them before the occurrence of those soaking rains, which generally precede the setting in of winter.

A mode of taking part of a crop is mentioned:—"Having ascertained that some of the tubers have attained an eatable size, go along the rows, and loosen the earth about each plant with a blunt stick, taking two or three of the largest tubers from each, and returning the earth carefully."

The most expeditious way of gathering a potato crop is, first to run furrows on each side of the rows, and then a deep one in the middle, which turns up most of the roots to the surface, for the purpose of picking up by hand. In this way, however, we should apprehend some waste, and should not advise it, except where potatoes are plenty, and labour scarce. A hoe with prongs, such as is sold at J. R. Newell's Agricultural Establishment, No. 52 North Market street, Boston, is, probably, the best implement for gathering potatoes.

Securing the crop.—Mr. Buel, of Albany, says, "There are many erroneous notions, in regard to the culture and treatment of the potato, which every class in society have an interest in exploding, as the root has become a necessary food for every family." These errors consist in supposing "1st. That potatoes should be grown on a dry, warm soil. 2d. That they should be dried in the sun, or washed, to render them pleasant to the eye. 3d. That they should be kept warm and dry during winter, to fit them for culinary uses. 4th. That they should be of large size." In contradiction to these popular opinions, he asserts, "*First*, that the best potatoes are grown upon cold, moist, but porous and rich soils. *Second*, that it were better the sun never should shine upon them—that they should be housed with all the dirt that adheres to them—that it is beneficial to add more dirt in the bin or cask, to exclude external air as much as possible. And, *third*, that their surface should be kept moist, and the atmosphere, which surrounds, as little above the point of freezing as possible."

Potatoes may be kept during winter in a cellar, free from frost, or in pits or caves in the field. In the latter case, they must be so situated on a dry knoll, or the side of a hill, as to be secured from the possibility of the pits being pervaded by water; and they must be so covered, first with straw and then with loam, as to prevent the intrusion of frost. They may, likewise, be placed in barrels, casks, or boxes, and if packed in moist sand, or the loam of the field in which they grew, they will be preserved better than in almost any other situation. If they are exposed to the sun and air till the upper side acquires a green colour, they become poisonous.

Use.—The use of the potato, as an article of diet both for man and beast, is, probably, more extensive, and more common, than that of any other vegetable production. From having no peculiarity of taste, and consisting chiefly of starch, it approaches near to the qualities of the flour of grain; "and for this reason," says London, "it is the most universally liked, and can be used longer in constant succession by the same individual without becoming unpalatable, than any other vegetable, the seeds of grasses excepted." Neill observes, "so generally is it relished, and so nutritious is it accounted, that, on many tables, it now appears almost every day in the year."

An Essay on the *Solanum Tuberosum*, by H. C. Worsham, from the *Philadelphia Journal of the Medical and Physical Sciences*, gives the following summary view of the excellent qualities of this superlative root:—"Having its origin in a warm climate, it was supposed to be intolerant of cold, and upon that account incapable of cultivation in a more northern clime. But experience has shown the contrary, and the potato is naturalized almost in every region. With the lower classes of people, it is one of the greatest blessings which the soil produces, forming 'flour without a mill, and bread without an oven;' and, at all seasons of the year, an agreeable, wholesome dish, without expensive condiments. What resources does the potato present to us? Its stalk, considered as a textile plant, furnishes in Austria a sort of flax—when burned, it yields much potash—its apples, when ripe and crushed, ferment, and give spirits by distillation—its tubercles, made into a pulp, are a substitute for soap, in bleaching. Cooked by steam, the potato is a most healthy food. By different manipulations it furnishes two kinds of flour, a gruel and a parenchyma, which may be applied to increase the bulk of bread made from grain. Treated chymically, it is converted into beer, vinegar, spirits, &c."

PRUNING.—"In pruning the apple-tree and all other standard trees, the points of the external branches should be every where rendered thin and pervious to the light; so that the internal parts of the tree may not be wholly shaded by the external parts. The light should penetrate deeply into the tree, on every side; but not any where through it. When the pruner has judiciously executed his work, every part of the tree, internal as well as external, will be productive of fruit; and the internal part, in unfavourable seasons, will rather receive protection than injury from the external. A tree, thus pruned, will not only produce much more fruit, but will also be able to support a heavier load of it, without danger of being broken; for any given weight will depress the branch, not simply in proportion to its quantity, and its horizontal distance from the point of suspension, by a mode of action similar to that of the weight of the beam of the steel-yard; and hence a hundred and fifty pounds, suspended at one foot distance from the trunk, will distress the branch, which supports it, no more than ten pounds at fifteen feet distance would do Every tree will, therefore, support a larger weight of fruit, without danger of being broken, in proportion as the parts of such weight are made to approach nearer to its centre.

"Each variety of the apple-tree has its own peculiar form of growth; and this it will ultimately assume, in a considerable degree, in defiance of the art of the pruner. Something may nevertheless be done to correct whatever is defective. When the growth of any variety is weak and reclining, the principal stem should be trained to a considerable height, before it be allowed to produce branches; and if any of these take a horizontal or pendent direction, they should be regularly taken off. One principal leading stem should be encouraged almost to the summit of the tree, to prevent a sudden division into two large boughs of nearly equal strength; for the fork which these form is apt to divide and break, when the branches are loaded with fruit. All efforts to give young trees a round and regularly spreading form, whilst in the nursery, will be found injurious in the future stages of their growth. Large branches should rarely or never be amputated."—*Knight's Treatise on the Culture of the Apple and Pear.*

"Hitt recommends that the shape or figure of standards should be conical, like the natural growth of the fir-tree; and this form, or the pyramidal or sub-cylindrical, is decidedly preferred by the French, and universally employed by the Dutch.

"*The season for pruning.*—For all the operations of pruning, which are performed on the branches or shoots of trees, it would appear the period immediately before, or commensurate with, the rising of the sap, is the best."—*Loudon.*

"My practice has been to prune in the spring, beginning when the buds have scarcely begun to swell, and ending before the expansion of the leaves. But I never leave 'stumps' of limbs. Every branch, that is taken away, is cut close and even with the stem or limb where it grew; and the healing of the wound commences and proceeds kindly as vegetation advances. If the branch cut off be large, the wound should be covered with some kind of plaster."—*Col. Pickering.*

If, however, pruning is commenced at a proper stage of the growth of the tree, and properly and seasonably attended to, it will rarely be necessary to take off a large limb, and small ones, if cut close and smooth, may be taken off any season. See remarks on pruning trees by a writer for the *N. E. Farmer*, vol. iii. p. 273.

PUMPKIN.—*Cucurbita pepo.*—The pumpkin is a native of India. Loudon says there are six species in cultivation, but gives no description of them. Russell's Catalogue enumerates the following varieties:

Finest yellow family pumpkin,
Connecticut field,
Large cheese,
Mammoth, (*which have grown to 226 lbs. weight*)
Seven years, (*a fine sort to keep.*)

Pumpkins will grow on any kind of soil, which is proper for head-crops, but the land cannot be made too rich for them. The *Farmer's Assistant* thinks they will grow better, when planted by themselves, than when raised, as usual, with Indian corn. "The hills, in such case, should stand about seven feet apart each way, and a number of seeds should be planted in each hill, to make allowance for what may be destroyed by insects. It will be well, however, to protect them by frames, covered by gauze, as directed p. 91, under the article CUCUMBER.

Preservation.—Pumpkins may be kept in a cellar, for this purpose, a considerable part of the winter; but the cellar must not be too warm; and care must be taken not to break off the stems, but leave these attached to them; otherwise they will soon commence rotting, at the places where the stems were broken off.—*Farmer's Assistant.* They may likewise be preserved in mows of hay or straw, or in any dry situation, in which they are secure from frost.

Use.—Loudon says of the pumpkin, "Though commonly cultivated in gardens for curiosity, yet, in some of the country villages in England, the inhabitants grow it on dunghills, at the backs of their houses, and train the shoots to a great length over grass. When the fruit is ripe, they cut a hole in one side, and, having taken out the seeds, fill the void space with sliced apples, adding a little sugar and spice, and then, having baked the whole, eat it with butter.—*Neill.* Pumpkin-pie, Abercrombie says, is very common [in Great Britain, and proverbially so in New England.] On the continent the fruit is a good deal used in soups, and also stewed and fried in oil and butter." Its culinary uses in the United States are too well known to need description; but some may not be aware that "Pumpkins are excellent for fatting horses. They, however, do not relish them at first; and therefore must be kept from feeding till they are hungry, before the pumpkins are offered to them, and let a little salt be first sprinkled on this food; when they will soon grow fond of it, and eat it readily without salt."

QUINCE.—*Pyrus cydonia.*—The quince is a native of the southern and eastern parts of Europe.

" *Varieties.*—Miller enumerates—

The oblong, or pear-quince, with oblong ovate leaves, and an oblong fruit, lengthened at the base.

The apple-quince, with ovate leaves, and a rounder fruit.

The Portugal quince, with ovate leaves, and an oblong fruit, which is more juicy, and less harsh than the others, and therefore the most valuable. It is rather a shy bearer, but is highly esteemed for marmalade, as the pulp has the property of assuming a fine purple tint in the course of being prepared.

The mild and eatable quince, less austere and astringent than the others.

" *Propagation.*—Generally by layers, but also by cuttings; and approved sorts may be perpetuated by grafting. In propagating for stocks, nothing more is necessary than to remove the lower shoots from the larger, so as to preserve a clean stem as high as the graft; but for fruit-bearing trees, it is necessary to train the tree to a rod, till it has attained four or five feet in height, and can support itself upright. It is seldom planted but as a standard in the orchard, and a very few trees are sufficient for a family.

"The time of planting, the mode of bearing, and all the other particulars of culture, are the same as for the apple and pear."—*Loudon.*

"The stem of the quince is employed for the reception of apple and pear grafts, and has the property of giving to the fruit it bears greater precocity, an increased size, and improved flavour; but with this drawback, that 'the quantity is small, and the product short-lived, as the age of the tree seldom exceeds ten or twelve years.' The quince-tree is liable to be attacked by the worm called the borer, the same as the apple-tree and the pear-tree, and the same remedies are recommended.

Use.—"The fruit is not eaten raw; but, stewed, or in pies or tarts, along with apples, is much esteemed. In confectionary it forms an excellent marmalade and syrup. When apples are flat, and have lost their flavour, Forsyth observes, a quince or two, in a pie or pudding, will add a quickness to them. In medicine, the expressed juice, repeatedly taken in small quantities, is said to be cooling, astringent and stomachic. A mucilage prepared from the seeds was formerly much in use, but is now supplanted by the simple gums."—*Loudon.* "This fruit is generally boiled and eaten with sugar, in which form it may be usefully employed in cases of dysentery. Five gallons of the juice of quinces, mixed with twenty-five pounds of sugar, and fermented, affords a delicious wine. By boiling the kernels of quinces in water, a mucilage is extracted, which is often used in medicine as a substitute for that of gum Arabic. Quinces are excellent in apple-pies, in the proportion of one fourth quince to three fourths apple, with some thin slices of candied lemon-peel or citron."—*Dom. Encyc.*

RADISH.—*Raphanus sativus.*—The garden-radish is a native of China, and introduced into England in 1584.

Varieties.—Mr. Russell's Catalogue contains the following:—

Early short-top scarlet, (*a superior sort,*)
Early frame,
Long white summer, or Naples,
Purple-short top,
Long salmon,
Cherry, or scarlet turnip-rooted,
White turnip-rooted,
Violet-coloured turnip-rooted,
Black fall, or Spanish.

Propagation.—All the varieties are raised from seed.

Soil and situation.—The soil should be light and mellow well broken by digging. A scattering of the smaller growing sorts may be sown among some broad-cast crops of larger growth, such as spinage, lettuce and onion; it may also be drilled between wide rows of beans, or on ground intended to be sown with a late spring crop.

Times of sowing.—"To have a constant succession of radishes at table, the seeds should be sown once a fortnight, from April [or the last of March] to August. Bu in midsummer they sooner grow sticky and strong, than in spring or fall. They must therefore be eaten while they are young. I have had better success with those sown in August than in any other month."—*Deane.*

Seed, process in sowing, and common culture.—"Sow each sort separately; and for a bed four feet six inches by twelve feet, two ounces of seed will be required of the spring sorts, and an ounce and a half for the autumn varieties All the kinds may be sown either broad-cast or in drills; but the latter is preferable, as allowing the roots to be drawn regularly, with less waste. If you sow broad-cast, it is a good method to make beds four or five feet wide, with alleys between, a foot wide, the earth of which may be used to raise the beds, or not, as the season may make it desirable to keep the beds dry or moist. Avoid sowing excessively thick, as it tends to make the tops run, and the roots stringy. Rake in the seed well, full half an inch deep, leaving none on the surface to attract birds. If you trace drills, let them be, for the spindle-rooted kinds, half an inch deep, and about two inches and a half asunder; for the small turnip-rooted, three quarters of an inch deep, and four or five inches asunder; and for the black turnip or Spanish, six or eight inches asunder, because the root grows to the size of a middle-sized turnip. As the plants advance in growth, thin them so as to leave the spindle-rooted about two inches square distance, and the other sorts three, four, or five, leaving the most space to the respective sorts in free, growing weather. In dry, warm weather, water pretty frequently: this swells the roots, and makes them mild and crisp."—*Abercrombie.*

"This root being liable to be eaten by worms, the following method is recommended for raising them:—Take equal quantities of buck-wheat bran, and fresh horse-dung, and mix them well and plentifully in the ground by digging. Suddenly after this a great fermentation will be produced, and numbers of toad-stools will start up in forty-eight hours. Dig the ground over again, and sow the seed, and the radishes will grow with great rapidity, and be free from the attacks of insects. Buck-wheat bran is an excellent manure of itself."—*Farmer's Assistant.*

Use.—"Formerly the leaves were often boiled and eaten; but now the roots are chiefly employed. These are eaten raw in spring, summer, autumn, and winter. The young seedling leaves are often used with cresses and mustard, as small salad; and radish-seed pods, when of plump growth, but still young and green, are used to increase the variety of vegetable pickles, and are considered a tolerable substitute for capers."—*Loudon.*

"Radishes are esteemed aperient, attenuating and antiscorbutic: when eaten in moderate quantities, they are in a certain measure salubrious to persons of strong habits; but are, in general, apt to produce a considerable degree of flatulency in those whose stomachs are relaxed. No radishes, however, ought to be eaten when *old*, or after having been kept some time, as they are then utterly indigestible, and render the breath very offensive.—*Dom. Encyc.*

Dr. Cooper observes that "Radishes ought to be sown in rich ground, and carefully tended, so as to grow quickly if not, they are become stringy, in which state they are very unwholesome and indigestible."

Seed.—"Radishes that are for seed require much room, as they grow to a large size. For this purpose some of the most thrifty ones should be left standing; or else be transplanted to a place where each shall have as much room as nearly a yard square. The ripeness of the seed is known by the pods turning brown. For this purpose the seeds must be sown early in the spring, because they ripen slowly."—*Deane.*

For forcing radishes, hot-beds, and culture proper for hotbed productions, should be resorted to. See *Encyc. of Gard.* p. 596.

RHUBARB.—*Rheum.*—There are three species of this plant in cultivation—the *R. rhaponticum*, a native of Asia; *R. hybridum*, also a native of Asia, and *R. palmatum*, a native of Tartary, distinguished by its elegant palmate leaves, and considered as the true Turkey or Russia rhubarb.

Propagation and culture.—"All the sorts may be raised either from seed or by dividing the roots. If from seed, which is the best mode, sow in light, deep earth, in spring; and the plants, if kept eight or nine inches asunder, will be fit for transplanting in autumn, and for the next spring. When the roots are divided, care must be taken to retain a bud on the crown of each section: they may be planted where they are finally to remain. When a plantation is to be made, the ground, which should be light and rather sandy, but well manured, should be trenched three spits, or as deep as the sub-soil will admit, adding a manuring of well rotted hot-bed dung. Then plant in rows, three feet wide by two feet, in the rows for the *R. rhaponticum* and *palmatum*, and five feet by three feet in the rows for the *R. hybridum*. No other culture is required than keeping the ground free of weeds, occasionally stirring it, during summer, with a three-pronged fork, and adding a dressing of well rotted manure every autumn or spring, stirring the ground as deep as possible. Some never allow the flower-stalks to produce flowers; and others cut them over as soon as they have done flowering, to prevent the plants from being exhausted by the production of seeds. The former seems the preferable method, as the flower-stalks of plants cannot, like the leaves, be considered as preparing a reserve of nourishment for the roots.

Blanching.—"The advantages of blanching the stalks of rhubarb, for culinary purposes, have been pointed out by T. Hare, Esq.—*Hort. Trans.* vol. ii. 'These are two-fold, namely, the desirable qualities of improved appearance and flavour, and a saving in the quantity of sugar necessary to render it agreeable to the palate, since the leaf-stalks, when blanched, are infinitely less harsh than those grown under the full influence of light, in an open situation.' It may either be blanched by earthing up the roots early in spring, or earthen pots may be used, as in blanching sea-kale.

Taking the stalks.—"Remove a little earth, and, bending down the leaf you would remove, slip it off from the crown without breaking, or using the knife. The stalks are fit to use, when the leaf is half expanded; but a larger produce is obtained by letting them remain till in full expansion, as is practised by the market-gardeners. The stalks are tied in bundles of a dozen and upwards, and thus exposed for sale.

To save seed.—"Leave one or two of the strongest flower-stalks to perfect their seeds, which they will do in July and August.

Use.—"The two first species are cultivated entirely, and the third, in gardens, principally, for the petioles of the root-leaves, which are peeled, cut down, and formed into tarts and pies in the manner of apples and gooseberries. The *R. hybridum* affords the most abundant and succulent supply for this purpose."—*Loudon.*

ROLLER.—This is a heavy cylindrical instrument, to pass over lands, render them more compact, and answer other useful purposes in field husbandry and gardening. Many of the complaints we hear, of seeds not growing, arise from their not being rolled. Many seeds will not vegetate at all, and many others will vegetate slowly, feebly, and unequally, if the ground be not rolled soon after the seed is sown. "Those rollers which are cut out of free-stone, being heavier than wooden ones, are best to smooth and harden the alleys in gardens. But wooden ones answer better in tillage, when they are sufficiently large. A roller for field-husbandry should be five or six feet long; so that it may perform much in a short time, being drawn by a horse or yoke of oxen, for either of which it may be easily harnessed. It should be made perfectly round and smooth, that it may be drawn the more easily, and press the ground more equally in all parts. And it should be from eighteen to twenty-four inches diameter Being large, the pressure will be greater, and the surface will be the more level."—*Deane.*

Where there is no roller on the premises, the following is recommended as a substitute:—After the seed is sown, and the ground well raked, take a board or boards, of the whole length of the bed; lay them flat on the ground; beginning at one edge of the bed, walk the whole length of the board; this will press the soil on the seed; then shift the board, till you have thus gone over the whole bed; and in dry weather, cover your beds, for forty-eight hours, with boards laid flat on the soil, and the seeds will come up almost immediately. If no boards are at hand, tread in the seed with your feet, or strike on the bed with the blade of your spade or shovel.

ROSE.—*See* FLOWERS, p. 125.

ROSEMARY.—*Rosmarinus officinalis.*—"The rosemary is a hardy under-shrub, a native of the south of Europe. It is an evergreen, rising sometimes six or eight feet high, though rarely. The leaves are sessile, linear, dark-green above, and grayish or whitish underneath; the blossoms are of a pale blue colour. The whole plant is highly aromatic.

"*Varieties.*—These are,

The green, or common.	The gold-striped,	The silver-striped.

Culture.—The green is hardiest as a plant, and is the sort generally used. The finest plants are raised from seed, sown either broad-cast or in drills, six inches apart. This plant is also propagated by cuttings and suckers. "Planted in the month of March, six inches apart, and inserted two thirds of their length in the ground, they will take root freely, and, by the month of September, be fit for transplanting wherever destined to remain."—*M'Mahon.*

RUE.—*Ruta graveolens.*—This is an under-shrub, an evergreen, which prefers a light soil, and is easily propagated by cuttings or seeds. Mr. Armstrong says, "its beauty is much increased by lopping the branches close to the earth every fourth year."

Use.—Boerhaave recommends the leaves of rue as of great service to persons of cold, phlegmatic habits; as they quicken the circulation, dissolve viscid or tenacious juices, remove obstructions, and promote the fluid secretions. Mr. Wilson, in his *Economy of the Kitchen Garden*, says, "The most effectual remedy for expelling worms, that has ever come under my observation, was effected by an infusion of the tops of rue, given in gin to the patient, in the morning, fasting."

SAGE.—*Salvia officinalis.*—Sage is a native of the south of Europe. Its varieties are,

The red,
The broad-leaved, or balsamic,
The green,
The small-leaved green, or sage of virtue.

Estimate of sorts.—"The red is the principal sort in culinary use, having the most agreeable and the fullest flavour; the green is next in estimation with the cook; but the small-leaved is generally preferred to those to eat as a raw herb, and for decoctions; while the broad-leaved, balsamic species is the most efficacious in a medical way, and is also a tea-herb. However, any of the sorts may be occasionally used for these alternate purposes.

Culture.—"They are all propagated alike, by seeds or suckers, and by portions of old roots, and grow well in any soil not positively wet. Till three or four years old, they have a healthy and agreeable appearance, forming full and regular tufts; but, after this period, they lose the central branches, and even become ragged and broken at the edges. The treatment already suggested for rue might be useful for sage. Under it, the roots would probably renew their vigour, and throw out new and healthy shoots; but of this theory we have no experience"—*Armstrong.*

Use.—"The leaves are used in stuffings and sauces, for many kinds of luscious and strong meats, as well as to improve the flavour of various articles of cookery. The decoction called sage-tea is usually made from one variety, the small-leaved green, or sage of virtue; but any of the others are equally fit for this purpose."—*Loudon.*

SALSIFY, *or* OYSTER PLANT.—*Tragopogon porrifolius.*—The salsify is a hardy biennial, a native of England. The root is long and tapering, of a fleshy white substance; the herb smooth, glaucous, and rising three or four feet high. The leaves resemble those of the leek; the flowers are of a dull purple colour, closing soon after midday; the seed, as in other species of goat's beard, is remarkable for having attached to it a broad feathery crown.

Culture.—"It resembles a small parsnep in its appearance It is raised annually from seeds, and as easily, requiring no more care than the carrot. It bears a tolerable crop.

Use.—"In this country it is parboiled, and then fried either in batter or without. It forms an admirable garnish for boiled fowls or turkies. In its taste it so strongly resembles the oyster, that, when sliced and fried in batter, it can scarcely be distinguished from it. If our gardeners would introduce it into the market, and our citizens once try it, there would be no danger of its ever failing hereafter to be raised. It is in eating from November to May, precisely the period in which our vegetable market is most deficient in variety."—*John Lowell, Esq. in Mass. Agr. Repos.*

"The stalks of the tragopogon may be cut in the spring, when they are four or five inches high, and dressed like asparagus, in which they eat very tender and well."—*Rees' Cyclopedia.*

SAVORY.—*Satureja.*—Two species of this plant are cultivated—the *winter* and *summer* savory.

Winter savory is a hardy under-shrub, a native of the south of France and Italy. The shoots are furnished with two narrow, stiff leaves, an inch long, placed opposite at each joint, and from the base of these a few small leaves proceed in clusters. It produces whitish flowers in May and June.

Summer savory is a hardy annual, a native of Italy. The branches are slender, erect, and about a foot high; leaves opposite, and almost an inch in length. It flowers in June and July.

Culture.—Winter savory is a perennial plant, and is propagated from seeds or slips; summer savory, from seeds only. Both sorts will grow on almost any soil, and it is said that the winter kind grows best on barren soils.

Use.—"Both the summer and winter savory have long been cultivated for culinary and medicinal purposes. Their warm, aromatic, pungent leaves are much esteemed in salads: formerly, they were employed medicinally, with a view to attenuate viscid humours, to dispel flatulency, and to increase the appetite. According to Professor Bradley, this herb, when dry, and put into a bed, possesses the remarkable property of expelling fleas."—*Dom. Encyc.*

SEA-KALE.—*Cramba maritima.*—The sea-kale grows spontaneously on many parts of the sea-coast of Great Britain. The inhabitants watch when the shoots begin to push up the sand and gravel, in March and April, when they cut off the young shoots and leaf-stocks, then blanched and tender, and boil them as greens.

Use.—"The young spring shoots, and the stalks of the unfolding leaves, blanched by rising through the natural ground in a wild state, or by earthing up in gardens, are the parts used; and, when boiled, and dressed like asparagus, are not inferior to that vegetable. They form also an excellent ingredient in soups. Sometimes the ribs of the large leaves are peeled and dressed as asparagus, after the plant has ceased to send up young growths. By forcing, sea-kale may be had in perfection from November till May, a period including all the dead months of the year. It is remarked by Nicol, that vegetables are seldom improved by forcing, but that sea-kale forms an exception, the forced shoots produced at mid-winter being more crisp and delicate in flavour than those procured in the natural way, in April or May. Sir George Mackenzie (*Caled. Hort. Mem.* vol. i 313) observes, that sea-kale cannot easily be overdone in cooking, and that, after being well-boiled, it should be thoroughly drained, and then suffered to remain a few minutes before the fire, that a further portion of moisture may be exhaled."—*Loudon.*

John Lowell, Esq., in a communication, published in the *Mass. Agr. Journal*, says, "It is very hardy—grows in any tolerable soil—is perennial, and costs not half the labour bestowed on asparagus. It may be raised from the seed or from the root, and fifty plants, occupying a very small space, will supply a single family. In its taste it resembles the cauliflower. The only labour it requires, is, to cover it with sand or earth, or with pots or boxes in March, so as to exclude the light, and to blanch it, or make it white. If not blanched, it is neither so beautiful to the eye, nor so tender, nor so delicate to the taste, as if blanched. It should be thoroughly boiled, and is better if boiled in milk and water. It should be served up like cauliflowers, with melted butter. It comes in at a season in which our vegetables in this country are very deficient."

Mr. Armstrong says, "In November, whether your bed has been filled with plants or with seedlings, be careful to cover them with a thick coat of well-rotted dung, and so soon in the spring or summer as you find them pushing through this covering, put over each a garden-pot inverted, having first stopped the bottom holes. The signal for cutting is when the plants have arisen about three inches above the surface."

SILK.—The following article, on a subject, whose importance is beginning to be duly appreciated in the United States, was written expressly for this work, at the request of the compiler, by a gentleman, who has a practical, as well as scientific knowledge of the processes pursued in Europe in the manufacture of silk:—

The cultivation of the soil is a duty, which was imposed on man almost coeval with the creation. It bears with it the sanctity of a primeval ordinance, and is irresistibly endearing, inasmuch as it admirably suits our nature, so as to promote, in a singular degree, health and comfort, vigour and clearness of mind; the blessing on a ready compliance with this divine law is evident from the happiness which flows therefrom, and which would make of the cultivators of the land, under some better advantages of education, the greatly favoured order of society. It is at the table of their own providing, that the nation is entertained—it is to the vigour, and to the faithfulness of their arm, that it trusts for its security.

All hail, Agriculture and its noble bands! On the fragrant earth their appointed labour is performed; their dome is the pure vault of heaven, and their employ is that by Mercy assigned for the renovation of our race. There, since the days of old, has been the firm foundation of national greatness and prosperity; and there it must remain until the end of time. It is to those purposes, that comprehensive and active minds would find delight in directing their powers, because of the vastness of the field to explore, and of the greatness of the results to be expected.

Much has been said of the roughness of the New England soil and climate, and much more than ever was true. Since the time of the Pilgrims, however, what harshness there was has been softened, and the climate, in our days, is hastening to take its rank among the most favoured for temperature and healthfulness. When the eye roams among our hills and vales, where can we meet with a more delightful variety? or a choice of aspects, and situations, so valuable for agricultural purposes? Some of our land is hard to work, because it wants a more thorough cultivation; and some abounds with rocks, that we may find there the best materials for our dwellings. What is there wanting, then, to make of New England a vast garden? Nothing, but contented labour, and intelligence to direct it—and that we have. Let all awake, then, and try to improve, to the best advantage, the natural abilities of the country—and we shall find, that, far from any cause of discouragement, we are greatly favoured.

To the cultivation of grain and potatoes, we have discovered (in late years) that the soil and climate are well adapted to the raising of wool, even of Merino; and in a wonderfully short time, all over the land, there are great sheep-folds. There are also manufactures that employ all that wool, and much more, and provide us with comfortable and handsome clothing.

There are other mines yet unexplored. To the industrious and active, the prize must belong; and to them, we wish to point out the article of SILK, as one most deserving their attention. What is there, that the soil can yield, so rich as silk, and that can be obtained with so easy a labour? Excepting the first raising and planting of the mulberry-trees, all the work can be performed by women, children, and aged people. We are fully and sufficiently satisfied, that this noble article may be made a staple of our country; and the advantages that would result from it, in a private and national point of view, are so important, that we cannot deny ourselves the satisfaction of devoting a few pages of this volume to that interesting subject—hoping that they may prove acceptable and, eventually, useful to many of our readers.

The raising of silk is not altogether novel in our land: many individuals in Massachusetts and Connecticut have attended to it for a number of years, with much advantage; and it is a fact fully established, that the soil and climate are congenial to the flourishing growth of the mulberry; and that the silk-worms will thrive in New England, under proper management, as well as they do in most parts of Europe, where the raising of silk is the vital sinew of the community. Without any further remarks, we shall enter, therefore, upon the subject, and set down, first, such practical information as relates to the raising of mulberry-trees.

The mulberry and the silk-worm are natives of Asia. They were both unknown in Europe until the year 555—when the emperor Justinian sent two monks to Serinda, in India, from whence they brought to Constantinople the seed of those precious insects, and the necessary information for their management. Thus they laid the foundation of those superb silk manufactures, which, for near seven hundred years, flourished in Greece, at Athens, at Thebes, and Corinth. Before that time, the great of the earth, alone, could afford to clothe themselves with silk; the price of which was weight for weight in gold. About six hundred years after, the culture of silk was introduced from Greece into Italy; and from thence into France, in the year 1494. Since those days, it has spread over all the southern and midland parts of Europe, and is now cultivated with success as far north as Prussia, where the mulberry-tree resists the most rigorous winters without injury.

There are two different species of mulberry,—the *black*, which is cultivated for its excellent fruit, of a dark crimson colour, almost black; and is a tree of slower growth than the white; the leaves are larger, of a darker green, thicker and stronger. The silk-worms will eat them for the want of better, but they do not thrive upon them, and the silk is coarse and inferior. The *white* mulberry-tree bears a white, or light pink fruit; and its leaves are the most congenial food for these precious insects; is of a quicker growth, and does not come to so large a size as the black. The white mulberry is a very hardy tree, and bears our severest winters without any apparent injury; will last a great many years, and, if cut down close to the ground, will send up many suckers all around, and resist destruction for several years. There are many kinds of white mulberry, the leaves of which differ in point of merit as a food for the silk-worm. Some are of a small size, earlier, and more tender; and, on that account, are cultivated as the most proper for the worms when first born; others are large, and of a peculiar quality, which suits the taste of the worms, upon which they thrive best, and make the handsomest silk. In France and Italy, they universally graft the wild stocks with those sorts which experience has taught them to be the most valuable.

At this early stage of the business with us, it would be difficult to attain, at once, the nicety which a long practice has introduced in the old countries. What we have to do for the present, is, to sow mulberry-seed, raise the young plants as in a nursery, reject those whereon thorns appear, as being the wildest, and bearing the smallest leaves; also those that have thick, coarse, hairy leaves. Save those that have the largest and handsomest smooth leaves; the worms eat them more readily, and experience has shown that they thrive best upon them, make more silk, and of a better quality. The best plants for earliness and superiority of leaves, should be set out and noted; as they may hereafter furnish scions for grafting. Upon a dry soil, the mulberry-trees do not grow much taller than our largest peach-trees; but they are stouter and thicker set. Their roots, which are of a remarkably bright gold colour, (that of silk,) extend to a considerable distance; and they ought not to be planted, on that account, nearer than thirty feet from tree to tree.

As the gathering of leaves too soon would injure the growth and constitution of the trees, we would recommend that no leaves should be gathered from them until after the fifth year. In the mean time plantations may be made for immediate use, by sowing the seed in drills, at a convenient distance; planting beans or potatoes between, to keep the ground clear of weeds. The second year after sowing, these seedlings might be cut down with a sharp instrument, three or four inches from the ground, and would give a second crop the same season. In the silk countries, they raise seedlings in rows for the first feeding of the worms: these young plants, putting out their leaves earlier than the old trees, and being more tender, are better adapted for the worms in the first stage of their existence. They also plant the mulberry-trees, and suffer them to grow according to unrestrained nature, branching out from the ground. This is for the convenience of gathering the leaves more easily, and making a food stronger than the seedlings. They consider the leaves from trees regularly trained, with a single butt, and of several years' growth, to give the most substantial food; upon which the worms should be kept during the last period of their life, previous to their ascending, in order to obtain an abundant crop of silk of the best quality. At our first entering on this new and profitable business, we shall be under the necessity of trusting wholly to our rows of seedlings, as the only food we can offer to the worms. But when the trees planted out come to maturity, we shall adopt the more systematic way of feeding, which experience has pointed out as most favourable; although, with us, the despatch of cutting down the seedlings for food, instead of the slow process of gathering leaves, will always remain an object of serious consideration.

The white mulberry thrives in all soils and situations, and will grow very rank and full of leaves upon low, moist ground; but the food it affords in such situations is very inferior, and apt to disorder the worms. A warm loam, even if gravelly, will give leaves of the best quality; and a sheltered, warm situation will produce leaves many days sooner than one which is exposed to cold, and is desirable on that account.

The mulberry-tree may be raised from suckers; and sometimes slips, stuck in a moist soil, will take root; if the low branches of a tree can be bent so as to be fastened, and covered in the ground, they will take root. The trees may be planted near buildings, for shade, or in a yard; the fowls are very fond of the fruit when it falls. A variety of situations will increase the means of early and late feeding, which is very desirable.

We shall conclude these remarks on the cultivation of the mulberry, by observing, that the most esteemed seed of that tree in Europe is that raised in Piedmont. The seed from Spain is also excellent. The seed of the best quality is large, bright, and heavy; when bruised, it will appear oily, and when thrown on ignited coals, it will crackle.

The next object to consider is, the *seed from which the worms are to be hatched;* and here it will be proper to observe, that one ounce of seed will produce about forty thousand worms, who will consume about one thousand pounds' weight of leaves, and produce from eighty to one hundred pounds of cocoons; and twelve pounds of cocoons will give about one pound of silk. It is of the greatest importance to procure the best seed, because that which is inferior will produce sickly worms, who will be much more exposed to the various disorders to which these insects are subject; a greater proportion will die, and those which survive will not make good cocoons. The best seed is of a dark grey colour, almost as dark as slate, looks bright, and if thrown into wine will sink. The seed which is light, of a white or yellow colour, and looks dull, is barren and good for nothing. The seed should be kept in a cool, dry situation, until the mulberry-trees have their leaves opened; when the food is thus in readiness, then is the time to get it hatched. In Italy and France, at that appointed time, the women put the seed in small bags of worsted stuff, and place them in their bosoms, during the day, and at night under their pillows, for about forty-eight hours; at the expiration of which, the seed is transferred into boxes, over which a paper cover is fastened with many small holes, through which the little worms will creep Some mulberry leaves should be placed on the paper, so that they may feed, which they will do as soon as they come to life. These boxes are placed on feather beds with pillows around them, in order to keep a uniform heat whilst the worms are hatching. Those which come to life in the course of the same day, should be collected and kept together; they will shed their skins, and ascend to make their cocoons, at the same period. The hatching of each successive day should be kept separate; this order will render their management and care easier, and more profitable. When the hatching has been well conducted, the heat proper and regular, most of the worms will make their appearance on the third or fourth day; and such seed as has not come to life on the fifth or sixth day is not worth preserving; for, if it should hatch, the worms will be weakly, and not likely to do well. If, on the second day, the seed that has been set to hatch should change colour, and appear red, it proves that the heat has been too great, and that the seed is spoiled.

In the middle provinces of France, where the climate is variable, and subject to sudden returns of cold, the cultivators are very cautious occasionally to exclude the outward air, by shutting the doors and windows, and always in the night and early part of the morning. Sudden cold, dampness, and especially foggy weather, are sure to injure the worms by bringing disease upon them, which will often prove fatal, and always reduce the quantity, and injure the quality, of the silk. A uniform temperature, not too warm, is considered as very desirable for the success of the silk crop; and about seventy-three degrees of the thermometer of Fahrenheit is the most suitable.

The silk-worms shed their skins four times, which is for them a period of sickness, during which they do not eat, but appear drowsy, and are more particularly affected by any sudden change of the weather to cold or damp. The first shedding takes place the sixth or seventh day after their birth; the head appears to increase in size, and they cast off their skins. This time of trial for them will last three or four days, if the weather is warm and genial; but if it is cold and damp, they are much longer to get through it. As soon as the skin is cast off, they appear active again, eat with a good appetite, and will continue so for six or eight days, when the second shedding comes on under the same circumstances, and is succeeded by a third and fourth shedding. The second shedding is the easiest for them, and fewer die under its operation than during the first, third, and fourth. Eight days after the worms have got through the fourth shedding, and at the end of about six weeks from the commencement of their existence, they have arrived nearly to maturity, and are going to make their cocoons, and reward the care that has been taken of them. They want then to go up to spin their cocoons, but it is necessary not to encourage this natural disposition, until it is evident that they are fully ripe. If they go up too soon, their cocoons will be light and flimsy. The signs of their full maturity are, some change in their colour, which until then is white; the head appears wilted, the tail larger, the green circles round the body become of a bright gold colour, and they keep moving about among the others, but without eating, and seem as if stretching their heads for the purpose of spinning. When the worms exhibit these indications, they should be separated from the rest, and put into a place where small, dry branches of oak, hazel, white birch, or any other wood, have been prepared for them to ascend and spin their cocoons. When they have ascended, it will be some days before they begin to spin. The first day they lay out threads for a foundation—the second, they form the shape of the cocoons—the third, the worm is entombed and out of sight, but continues to spin (inside) until he has expended the whole of his stock of liquor, which, in general, is the seventh or eighth day. The thread of a good cocoon is about nine hundred and fifty feet.

It is highly important to feed the worms in that particular way which experience has shown to be the most suitable; the leaves, at all times, should be dry when given to them; therefore, when rain is likely to fall, it is necessary to gather in a stock, before they get wet; if the weather set in to steady rain, the leaves should be spread in a separate room, and dried before they are given to the worms; leaves wetted by rain, or dew, will either kill them, or bring on some bad disorder; from their birth to the second shedding, they should be fed twice a day, morning and evening; afterwards three times a day, to the fourth shedding; and then, until they ascend, four, five, or six times a day, as they may seem to require it; from the fourth shedding until they ascend, their appetite is voracious, and it should be satisfied by an abundance of leaves of the best quality; those from old trees, matured by age, should be reserved for this period, and given to them fresh gathered and dry.

The worms, throughout the period of their existence, should be attended with great care and regularity; they should be kept perfectly clean, clearing away, often, the remains of the leaves, their own ordure, &c., which otherwise would create a disagreeable effluvia, and breed disorders among them; bad smells are very obnoxious to them, and no smoking of tobacco should be allowed where they are kept; they should be fed early in the morning, and good leaves should be given them regularly at the times appointed, that no waste of food may take place; the leaves should be fresh gathered, unless in rainy weather, and no leaves offered to them, that have been kept in the house until they have become yellow and sour, which will be the case, in general, after the third day; it is upon these attentions, that a good crop depends; half-starved, neglected worms, will give light, flimsy cocoons, whilst the diligent will get them heavy and rich; worms well attended to, and generously fed, will complete the crop within forty-five or fifty days; those that are neglected will languish over two months, and yield a light result.

The French and Italian establishments require large premises, and a great variety of utensils, such as benches, baskets, boxes of various sizes and shapes, to suit their extensive concerns; in the progress of time, it will become advisable for us to get acquainted with the minutiæ of their arrangements; but at the present day, we shall only point out such preparations as may be requisite to make a beginning, and which each individual concerned may afterwards increase and modify, according to his own views and situation.

Wherever silk-worms are to be raised in any number, it is evident that a room should be appropriated solely for that purpose; any aspect will answer, except north; the worms require heat, but it must be a free heat, that is, with a sufficient circulation of air; a close, sultry air is very bad for them, and so is a damp air; we would much prefer, on that account, a room up stairs to one on the ground floor; an unfinished room would answer very well; the doors and windows ought to be closed whenever a sudden transition to cold or damp takes place, or a thunder-storm comes on, which, oftentimes, will prove an injury to these insects; shelves or boards, put up round the room, would be very convenient to keep the worms on, and, if requisite, a frame in the centre of the room, with shelves one over the other, sheets of large, stiff paper, or of pasteboard, with the edges turned up all round, and stitched at the corners, would answer very well to keep and feed the worms in, and when they are to be cleaned, new leaves might be put in a fresh paper, and laid by the side of that which wants cleaning the worms would leave it quickly to go to the fresh leaves

It will be necessary to appropriate a corner for the diseased worms; in the most favoured crop, there will be many, and they ought to be taken away immediately, from among the rest, and put into the hospital to recover, otherwise the contagion may extend, and a great loss ensue.

After the cocoons are made, the first care is to take them down from the brush, clearing away the loose silk by which they are fastened, and selecting the best, those that feel hard and substantial, and of the brightest colour, to keep for seed; the most desirable are the worms, which, at the hatching time, came to life first; they prove to be the most hardy, and will make the best stock; it is necessary to keep an equal number of each sex; the male cocoons are the longest and thinnest, pointed at both ends; the females are larger and rounder, blunt at both ends, and resembling somewhat in shape a hen's egg; these chosen cocoons are to be threaded with a needle, in strings of fifty, more or less, taking great care to run the needle slightly through the silk, without hurting the chrysalis which is inside; these strings are to be hung against the wainscot of the room, and, in the course of from fifteen to twenty days, the millers will come out, males and females; the males always come out first; the females are the whitest and the largest; the males appear most active, and shake their wings. It is necessary to procure pieces of woollen cloth, (the Italians always use scarlet,) and to place the millers on them in rows, male and female by the side of each other; after pairing, the male dies; the female soon lays her seed on the cloth; it appears as if glued on; a female yields about three hundred seeds; they are first white or yellow, and change to various hues, and finally, if good, become and remain of a dark grey. The Italians preserve the seed on the pieces of scarlet cloth, and at the proper time their women wear them in their bosoms, as observed before, to hatch it. The French are in the habit of scraping the seed off from the cloth, and by wetting, slightly, the back of the cloth, it will come off easy, and without injury; they put it up, then, in small bags; whether it is scraped from, or left on the cloth, it should be packed carefully, and preserved over the winter, in a *dry* place, *where it does not freeze, and where it is not too hot;* if it should freeze, the principle of life would be destroyed, and if it should be too warm, the seed would start for hatching, and would be lost; one hundred pair of cocoons will weigh about one pound, and give about one ounce of seed.

Persons who intend to make a business of raising silk should raise their own seed; it is too important a part of the concern to intrust to strangers; they should pay the most particular attention to the choice of the cocoons, which they select for seed, and to the preservation of that seed through the winter. The French use stoves to warm occasionally the rooms, where the worms are reared, and thus secure them against any unexpected return of cold weather, and perhaps it may be requisite to use that caution in such parts of New England, as are much to the north or west of Boston; in its neighbourhood, and farther south, we believe that it would not be necessary, and that the only caution requisite, would be the closing of doors and windows, whenever a sudden change in the weather might require it. We have observed before, that hot weather is favourable for the worms, and they can bear it to a high degree, provided it is not sultry and close; on that account, the room where they are kept should be so situated, and the windows so arranged, that there may be at any time a thorough draft, when wanted, so as to prevent that deadness of air, and unpleasant smell, which would greatly endanger the health and lives of the worms; in extreme cases of sultriness, the French are in the habit of burning a small quantity of nitre, in an earthen ware dish, which greatly improves the atmosphere of the premises; it may also answer a good purpose, in such cases, to heat a brick or a stone, and throw on it some vinegar.

Respecting the hatching, from the information we have obtained of individuals who have attended to that business in our country, nothing is required, when the proper time comes, but to place the seed in a warmer room, but not to the sun, and it will hatch naturally in the course of a short time; it will take several days, and a longer time than when assisted by human heat; but which is the best, and preferable method of the two, for our climate, time and experience must determine; the French and Italians think the finest crop is generally secured by hastening the worms through the various stages of their existence, from the hatching to the ascending, and that any check or delay is to be esteemed as unfavourable to the ultimate success; hence their vigilance to secure an even temperature in the apartments, an abundance of food for the worms, adapted to their age, in its quality, a perfect and constant cleanliness, and such an arrangement of the windows, doors, and traps in the floors, as to ensure a free circulation of air, and to prevent that suffocating and offensive atmosphere, which would undoubtedly occasion a great mortality among them. The cocoons will not be of a uniform colour, they will be of various shades of yellow, and some white, yet they all are of one and the same species, and may all be worked together; after the cocoons are gathered, and cleared of the flos silk, which fastened them to the brush, they should be reeled without delay, and before the millers come out, for if the silk is left on until then, the quality is thereby injured; they should be thrown into a kettle of hot water, a small quantity at a time, and stirred with light, clean rods; this will dissolve the tenacious gum by which the threads adhere together; female industry will search out the end of the thread, and wind and spin the threads from ten to fourteen cocoons together into one single thread, with that care and correctness which will make a silk perfectly even, and perfectly clean.

Here we could enter into minute details, and furnish drawings of such winding and reeling machines as are used in the large Italian and French establishments, but we consider that, at the present early period, it would have a tendency to fatigue and perplex the attention of such of our readers as may wish to embark in a trial; their first attempt will probably be upon a limited scale, and undoubtedly the simple means used for winding and reeling in this state and in Connecticut, which may be more easily learnt by actual view than by tedious descriptions, will be found amply sufficient, and, as we progress in the business, our own intelligence and experience, gradually assisted by further information respecting the practice of Europe, will make us fully acquainted with the best process. When it is not convenient to wind and reel all the cocoons at that time, then all the millers must be destroyed before they come out, in order to save the silk from injury; this may be done in the following manner;—a kettle of hot water must be prepared, and, when boiling, a sieve, filled with cocoons about three or four inches thick, may be placed over the kettle, so as to receive the hot steam without dipping in the water; a wooden cover may be placed over the sieve to confine the steam, and, after leaving it in that situation for about ten minutes, you throw the cocoons into a cloth, and wrap them up in it, that the heat may be sure to penetrate into them, and destroy the life of the chrysalis; they must, immediately afterwards, be spread in the sun to dry thoroughly, and then be put away on shelves, or on a floor, spread very thin, that the dead insects within may dry up and harden, otherwise they might corrupt there, and stain the silk; when this is done, the cocoons may be kept, if convenient, for three years, without any ill effect to the quality of the silk, which will wind easily, and be as good as if it had been wound immediately, but will not appear quite so bright.

At the opening of the season, the object to attend to is, as soon as convenient, to procure good seed of the white mulberry, and to sow it in rows as before directed, hoeing the young plants carefully and frequently, to keep them free from weeds, and as thrifty as possible, that they may gain strength not to suffer from the first winter: the second spring after sowing, they will be in a good condition for gathering, and feeding the worms; nay, any person, who should feel desirous of driving the business, might begin to use them the first spring after sowing, and keep one sowing in reserve, not to be used until the third year, when the plants, being better rooted, and stronger, could bear, without any ill consequences, to be cut down near the ground, and would soon be up again for a second crop; it would be desirable to transplant some of the young trees into edge rows, placing them at the distance of two feet apart, and suffering them to grow in the manner of bushes, which would be convenient for gathering the leaves; some also should be transplanted to grow singly with a butt; such trees (as mentioned before) will give the best and most substantial food; thus the drills of seedlings would give the earliest and tenderest food for the little worms at their birth, the leaves of the edge-rows would afford a food next in substance, suitable after the second shedding, and the leaves of the mature standard trees would, after the fourth shedding, offer to their voraciousness that substantial food, which is very requisite, at that time, to satisfy them, and to ensure a rich and heavy crop; choosing for the whole plantation a piece of sheltered, high ground, sweet and well laid to the sun, and planting ridges, hedges, and trees, in such a manner as will give to all the uninterrupted benefit of the light and heat of the sun.

Fully aware of the importance of the object we have presented to the attention of the community, we cannot leave it, without making a concluding appeal to the intelligence and energy of our countrymen, not to suffer any delay to take place in setting their hands to a work so promising of results the most favourable to our comforts, and for our welfare: the first step is within the farmer's immediate department, to sow the mulberry-seed, and rear the young trees; and after two years of attendance, the silk raising may commence in good earnest, and will become a healthy and pleasant business for children and young women. This rich crop will require but two months' care to secure it, and, when the business shall flourish on a large scale, which we may anticipate as probable within a short period, the raising of the cocoons will become a distinct occupation for farmers' families; the winding and reeling of them, most probably, will be carried on as a distinct and separate branch of industry; this is actually the case in all the silk-growing countries, where the cocoons are carried to the public markets, and sold for ready cash to those who keep filatures, where they wind and reel them.

Great advantages will accrue to the younger members of farmers' families, in cultivating so pleasant and profitable an employment at home: it will offer to many young women a choice between home and the factories, and a resource in case the liberal encouragement given to manufactures should eventually prove the cause of business being overdone; it will also offer valuable resources for the pauper establishments, where the old and infirm, under a discreet and judicious government, may be made to provide themselves a comfortable support. If we take a retrospective view of the affairs of mankind, since the times of early record, we find that the riches and the prosperity resulting from commerce and navigation, or from a system of extensive manufactures, however brilliant, are comparatively of short and uncertain duration; the changes of views and systems of a government at home, the changes of policy among foreign nations, render the whole fabric subject to many sudden and unforeseen vicissitudes, and dependent upon the results of relations abroad, and of the compromise of jarring interests at home, setting at defiance, in the course of time, the subtle calculations of the most accomplished statesman; but the prosperity which is founded upon a perfected agriculture, that combines with intelligence the abilities of the soil and climate, so as to naturalize, by industry, rich crops of products, unknown to its original situation, is a prosperity not liable to changes; it becomes inherent and lasting. Of the great results of a rich cultivation upon the circumstances and ability of a people, Italy affords a convincing illustration: although groaning under bigotry and priestcraft, without foreign commerce, and without foreign navigation, yet, at various periods, three or four years of peace, with good crops of silk and oil, (silk is the richest,) have filled the country again with competence, after the dreadful devastations of war.

There is a certain order in society, the members of which, although not united by the bonds of corporate privileges, although unknown to, and unacquainted with, each other, yet move on with a steady and harmonious step to one common end,—the prosperity of their country, the welfare of all its inhabitants; to them, the powerful Bearers of Light, respectfully, we would recommend the consideration of the object of these lines, and if their judgment joins in accordance with our own, we invite them to endeavour to accelerate its completion, and to save it from a lingering course through one or two generations. The knowledge of the rearing of silk was imparted, in the course of about six hundred years, by Greece to neighbouring Italy, and in about three hundred and forty years more, it was communicated across the line between Italy and France; thus the progress was slow indeed; but such are the miserable results of ignorance and bad policy.

We would repeat, that the first step is to prepare an abundance of food for the silk-worms by stocking our warm, light lands with white mulberry-trees; accordingly, wherever there are now white mulberry-trees bearing fruit, the fruit should be carefully collected, when fully ripe, and the seed should be washed out, dried, and preserved; it will be much wanted, and it is both the duty and the interest of the owners not to suffer even the smallest part to go to waste.

SKIRRET.—*Sium sisarum.*—"The skirret is a perennial tap-rooted plant, a native of China. The lower leaves are pinnated, and the stem rises about a foot high, terminated by an umbe of white flowers, in July and August. The root is composed of fleshy tubers, about the size of the little finger, and joined together at the crown or head: they were formerly much esteemed in cookery. In the north of Scotland, the plant is cultivated under the name of *crummock*.

" *Culture.*--This plant grows freely in a lightish soil, moderately good. It is propagated both from seed, and by offsets of established roots. The better method is, to raise seedlings, to have the root in perfection, young and tender.

" *By seed.*—'Sow between the 21st of March and the 15th of April; a fortnight later, rather than any earlier, for a full crop, as plants raised forward in spring are apt to start for seed in summer. Sow on an open compartment of light ground, in small drills eight inches apart. When the plants are one or two inches high, thin them to five or six inches asunder. They will enlarge in growth till the end of autumn; but before the roots are full grown, in August, September, or October, some may be taken up for consumption as wanted: those left to reach maturity will continue good for use throughout winter, and in spring, till the stems run.'

" *By slips.*—'Having some plants of last year's raising, furnished with root-offsets, slip them off; taking only the young outward slips, and not leaving any of the larger old roots adhering to the detached offsets; which plant by dibble, in rows from six to nine inches asunder. They will soon strike, and enlarge, and divide into offsets; which, as well as the main roots, are eatable, and come in for use in proper season.'

" *To save seed.*—Leave some old plants in the spring; they will shoot up stalks, and ripen seed in autumn."—*Loudon.*

" *Use.*—The tubers are boiled, served up with butter, and are declared by Worlidge, in 1682, to be 'the sweetest, whitest, and most pleasant of roots.' "—*Loudon.* The common skirret has an agreeable aromatic flavour, and abounds with saccharine particles: hence it has been conjectured that sugar might be advantageously extracted from the root; and M. Margraff states, that he obtained one ounce and a half of pure sugar from half a pound of this vegetable. In a medicinal view, it possesses diuretic properties, and is in a slight degree stimulant.—*Dom. Encyc.*

SPINACH, *or* SPINAGE.—*Spinacia oleracea.*—The common spinage is an annual plant, but it is not known of what country it is a native. The leaves are large, the stems hollow, branching, and, when allowed to produce flowers, rising from two to three feet high. The male and female flowers are produced on different plants: the former come in long terminal spikes; the latter in clusters, close to the stalk at every joint.

Varieties.—Russell's Catalogue contains the following:—

Round-leaved, or summer;
Prickly, or fall;
English patience dock, *rumex patientia,* (*for early greens*;)
Holland or lamb's quarter;
New Zealand, *tetragona expansis,* (*a valuable new sort.*)

Times of sowing.—"The round is sown in April—the others from August to September. The prickly is sown in August and September for early spring greens."—*Russell's Catalogue.*

Soil and situation.—As the excellence of *spinaceous* plants consists in the succulency of the leaves, almost every thing depends on giving them a rich soil, stirring it frequently, and supplying water in dry seasons. The space they occupy in the garden is not considerable, say a thirtieth part; more especially as some of them, the common spinage for example, often come in as a temporary crop between rows of peas or beans, or among cauliflowers, broccoli, &c.

Seed and process in sowing.—"When raised by itself, spinage is generally sown broad-cast, and two ounces will sow a bed four feet and a half by thirty feet; but in drills, one ounce will sow the same space. In drills it is easier to weed and gather: let the drills be from nine to twelve inches apart. Beds four feet wide, with small alleys, are convenient of access. Let the ground be thoroughly dug. Whether broad-cast or in drills, sow thinly, and rake or earth in about an inch deep.

Subsequent culture.—"When the plants are up, showing leaves about an inch broad, clear them from weeds, either by hand or small hoeing, and thin the plants, where crowded, (especially the broad-cast crops,) to three inches apart; and, when advanced in growth, every other may be cut out for use, increasing the distance to about six inches, that the remainder may grow stocky, with large spreading leaves. The plants of the early and succession crops attain proper growth for gathering in April, May and June. When the leaves are from two to five inches in breadth, cut the plants clean out to the bottom, or sometimes cut only the largest leaves. But as soon as there is any appearance of their running to seed, they may be drawn out clean as wanted."

To save seed.—"To obtain seed of the round-leaved, leave a sufficient quantity of established plants in April, May, or June, to run up in stalks; or transplant in autumn some of the spring-sown which have not run. To save seed of the triangular spinage, transplant, in March, some good strong plants, of the winter crop. For large supplies, a portion of each may be sown in February, or the first fortnight of March, to stand wholly for seeding. Sow each sort separate. Respecting both sides, observe that they are of the class *Diœcia*, the male and female flowers growing separately, on two distinct plants. When the plants are flowering for seed, the cultivator should examine whether the male plants, distinguishable by the abundant farina upon the blossoms, stand crowded or numerous to excess; in which case he should pull up the superfluous plants, leaving a competency for fertilizing the female blossoms, which else would prove abortive. And when the female blossoms are set, it is best to dispose of all the male plants, drawing them by hand; which will give more room to the females to grow and perfect their seed. The plants rejected may be profitably given to young pigs. The seed ripens in July and August."—*Abercrombie.*

Use.—"The leaves are used in soups, or boiled alone, and mashed, and served up with gravies, butter, and hard-boiled eggs. The leaves may be obtained from sowings in the open ground at most seasons of the year, but chiefly in spring, when they are largest and most succulent."—*Loudon.* "According to the opinion of French physicians, this plant is not only food, but physic, and is hence emphatically called '*Le balai de l'estomac*'—the broom of the stomach—sweeping and deterging every hole and corner of that organ, without giving pain, or in any degree interrupting the ordinary avocations of the persons employing it."—*Armstrong.*

SQUASH.—*Cucurbita melo pepo.*—The squash is a species of the *cucurbita*, and seems to be the link which connects the melon and pumpkin.

The *varieties* mentioned in Russell's Catalogue are—

Early bush summer;
Long crook-neck, or bell;
Vegetable marrow;
Acorn;
Commodore Valparaiso, (*grows large, and is highly esteemed;*)
Canada crook-neck; (*small, and of superior quality.*)

"Squashes, of every kind, may be cultivated as directed for cucumbers and melons—should be sown at the same time, and at similar distances, with this difference, that two plants of these will be plenty for each hill, and that they are easier pleased with soil and preparation than the others."—*M^cMahon.*

Use.—The squash is applicable to all the uses of the pumpkin, and, for many purposes, is superior to that vegetable.

STRAWBERRY.—*Fragaria.*—The substance of the following article was written for this work, at the particular request of its compiler, by a gentleman of Boston, whose success, as a practical, is equal to his skill as a scientific horticulturist; and whose liberality in imparting his knowledge, as well as the results of its successful application in introducing excellent varieties of fruits, merits the thanks of the community.

Varieties.—Every year is producing new varieties of this as well as almost all other fruits, from the care and attention which are bestowed on them by the scientific cultivators of Europe, among whom, at the present day, Mr. Knight, the president of the London Horticultural Society, seems to take the lead.

Society owes much to these gentlemen, and they are constantly receiving the reward of their labours from the many and continued testimonies of approbation, which their success calls forth. But their chief gratification is derived from the pursuit itself, which, above all others, is calculated to soothe and tranquillize the mind, and to lead men to "look through Nature up to Nature's God."

The kinds most esteemed in England are the pine, imperial, Bostock, Surinam, Bath scarlet, Downton, roseberry, Hudson Bay, large scarlet, musk hautbois, round hautbois, and flat hautbois.

In France, the Bath scarlet is of long standing, and much esteemed. The white, the Alpine, or monthly, and the Chili, are also favourites.

The *Chili* is a shy bearer, but very large when it comes to maturity—is not, I believe, known here: it stands on a stiff, upright, and strong stem, in lieu of a pendulous one, like the Hudson.

The *Downton* is, however, I believe, a larger strawberry, and is uncommonly high flavoured. There are other new varieties very large, of which I know nothing. The form of the Downton is various; many of them are shaped like a cock's comb, which name it has obtained in some horticultural works. It was raised from seed by Mr. Knight, at Downton, the name of his estate, and is a very good bearer.

The *roseberry* is, in point of flavour, surpassed by no cultivated strawberry I have seen. It resembles, in form and flavour, the Alpine, but is a better bearer. This last,

The *Alpine*, is a monthly strawberry; it continues in bearing from June until October in this climate—is like the wood-strawberry in form and flavour, but is a shy bearer.

The *scarlets* are all large and fine fruit; the largest variety are fine flavoured and very early. They are not very great bearers, but should be cultivated as valuable varieties, as well as for their beauty and excellent qualities.

The *hautbois* is the favourite English strawberry. It is totally different from what is commonly called the hautbois in this country. The flat hautbois grows generally on the top of the vines—is brown, and greenish white when ripe—fine flavoured, pretty good bearer, but difficult to detach from its stalk.

The *round hautbois* is of a dark purple when ripe—is somewhat in form like the common red strawberry, out larger; and the

Musk hautbois is like the preceding—a shy bearer, but very delicious.

The *wood-strawberry* is far before any other in point of flavour, and, if transplanted into gardens, may for two or three years answer very well; and if not too highly manured, preserve their flavour and increase their size. But new plants must be obtained, every two or three years, from the woods, to make new plantations, or they will degenerate.

Soil and manure.—The soil proper for this last mentioned variety, as well as all others, is light, warm, and gravelly; and the manure to be applied should be exclusively vegetable, and not animal manure. The usual practice is to manure the ground with rotten dung, with a view to increase the size and quantity of fruit; but, in doing this, the flavour of the fruit is destroyed in proportion to the richness of the soil. Besides, high manuring produces strong vines and little fruit. Rotten leaves, decayed wood, ashes, in small quantity, mixed with other vegetable substances in a compost heap, will make better manure for strawberries than any animal substance whatever. As the vines which bear this fruit require great moisture to bring the fruit to its proper size, the soil and situation in which they are placed must not be too dry.

Propagation.—The usual time for transplanting strawberry-plants is August. That time is chosen because they have then done bearing, and have made offsets, if the season has been favourable, of strong plants, set from their runners. Plantations made at this season will bear some fruit the next summer. But, if you can get good vigorous plants in May of the preceding season, I prefer to plant then, as it saves a year, nearly, the plants being ready to bear abundantly the next year.

Gardeners have different habits and opinions as to trimming the plants when they are put out. Some cut off all the old leaves, and preserve only the *naissant* leaves in the centre of the plant. Others take off the dead or decayed leaves only, and plant with all the old healthy leaves on the plant. This last plan is highly recommended by the Abbé Rozier, but, so far as my experience goes, I have found the first mentioned course the best. Many people cut the roots in before they put them into the ground: all dead substances should be cut off, but not the roots. When the plants are put out, they should be kept free from weeds, and the ground should be kept loose about them. If the plants are strong, put but one to form the stools; if weak, put two.

As regards the distance at which plants should be set, cultivators differ. The common red strawberry, which is found in all our gardens, may be put eight inches apart in rows nine inches or a foot from each other, and allowed to form a matted bed of eighteen inches or two feet wide, with a foot-path of a foot wide between them. But the larger and finer sorts should be planted in stools in beds four and a half feet wide, with a path of fifteen inches or more between the beds. In these beds the plants should be set, by a line, fifteen to eighteen inches apart, both ways, taking care to set them in quincuncial order, and to keep them from running together.

The objection generally made to this mode of cultivation is, that the fruit is exposed to be injured by lying on the ground, where it is bruised and covered with dirt every time it rains. This, however, may be prevented by a little care. In some parts of Europe, where moss is plenty, it is collected and put round the stools, so as to prevent the fruit from lying on the ground, and at the same time to prevent the moisture round the plant from evaporating.

In some places, where moss is not to be got, straw is used for the same purpose; hence the English name of straw berry.* But I think that leaves of trees that have been collected in the spring, and kept under cover, are better than either, and particularly the oak-leaf; because, when they are no longer wanted to protect the fruit, and keep the moisture in the ground, they can be dug in round the stools, where they serve as most excellent manure for this delicious fruit.

The strawberry may also be propagated by seeds. Knight, in making experiments, with a view of ascertaining whether most of the sorts would not breed together indiscriminately, raised above four hundred varieties, "some very bad, but the greater part tolerably good, and a few very excellent." The fruit of above a dozen sorts was sent to the Horticultural Society [in London] in August, 1818, and found of various degrees of excellence. The seeds, if sown immediately after gathering, will produce plants which will come into bearing the following year.—*Loudon.*

"*Use.*—The fruit is fragrant, (whence *fragaria*,) delicious, and universally esteemed. It consists almost entirely of matter soluble in the stomach, and neither there nor when laid in heaps, and left to rot, does it undergo the acetous fermentation. Hence it is very nourishing, and may be safely eaten by gouty and rheumatic persons. 'In addition to its grateful flavour, the subacid juice has a cooling quality, particularly acceptable in summer. Eaten either alone, or with sugar and cream, there are few constitutions with which strawberries, even when taken in large quantities, are found to disagree. Further, they have properties which render them, in most conditions of the animal frame, positively salutary; and physicians concur in placing them in their small catalogue of pleasant remedies. They dissolve the tartareous incrustations of the teeth. They promote perspiration. Persons afflicted with the gout have found relief from using them very largely; so have patients in cases of the stone; and Hoffman states, that he has known consumptive people cured by them. The bark of the root is astringent.'—*Abercrombie.*"—*Loudon.*

SUNFLOWER.—*Helianthus annuus.*—This plant is a native of South America, but naturalized and become com mon in the United States. It is easily propagated in any common soil, either by sowing the seeds, or by slips or offsets from the roots.

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* This name is common in all the northern countries, while in France, and countries south, it is said they take their name from their flavour, or the botanical name *fragaria.*

From a paper on the subject of sunflower-oil, in the first vol. of *Trans. Amer. Phil. Society*, it appears that one bushel of seed yields three quarts of oil; and that this quantity of seed is produced from one hundred plants, set about three feet apart, in the same manner that Indian corn is planted. The oil is thin, clear, and of an agreeable taste.

The process for expressing the oil is the same as that of making linseed-oil.

TANSY.—*Tanacetum vulgare.*—Tansy is a perennial plant, which grows without cultivation in Great Britain and in some parts of the United States.

Culture.—Tansy may be propagated in spring or autumn by rooted slips, or by dividing the roots into several sets: plant them in any compartment of the kitchen or physic garden, from twelve to eighteen inches asunder. The plant continues for several years, producing abundant tufts of leaves annually. As they run up in strong stalks in summer, these should be cut down to encourage a production of young leaves below on the stem. To have young tansy in winter, plant some roots either in a hotbed, or in pots placed therein, or in a pinery, or forcing house, at any time from November to March.—*Abercrombie.*

Use.—"The young leaves are shredded down, and employed to give colour and flavour to puddings; they are also used in omelets and other cakes, and were formerly in much repute as a vermifuge."—*Loudon.*

TARRAGON.—*Artemisia dracunculus.*—*Culture.*—This is a perennial plant, which may be propagated from seed, or from slips or offsets, in the same manner that tansy, mint, &c. are cultivated.

Use.—"Tarragon is frequently used in salads, especially by the French, to correct the coldness of other herbs. The leaves make an excellent pickle: they have a fragrant smell and aromatic taste. The use of them in Persia has ever been general, at meals, to create an appetite. The famous vinegar of Maille, in France, owes its superior flavour to this plant, which is now common in Pennsylvania."—*Dr. Mease.*

TEASEL.—*Dipsacus.*—The teasel or fuller's thistle is an herbaceous biennial, growing from four to six feet high, prickly or rough in the stem and leaves, and terminating in rough, burr-like heads of flowers.

Propagation and culture.—This plant is propagated by sowing the seeds either in March or April, upon a soil that has been well ploughed, and it is observed that good wheat-land is well adapted for the production of teasels. The ground being ploughed and made fine, from one peck to two of seed is generally sown upon an acre, and harrowed in with a light harrow. When the plants are up, hoe them in the same manner as practised for turnips, thinning out the plants from time to time, till eventually they are left about a foot apart. They should be kept clear from weeds, and the second year after sowing, the plants will shoot up stalks with heads, which are collected in August, as soon as they begin to turn brown. They are then exposed daily to the sun till they become perfectly dry, care being taken to protect them from rain. They are to be collected as they turn brown and ripen, and not all at once.

Use.—This plant is cultivated in great quantities, in the west of England, for raising the nap on woollen cloths, by means of the crooked awns or chaffs upon the heads; which in the wild sort are said to be less hooked. For this purpose they are fixed round the circumference of a cylinder, which is made to turn round, and the cloth is held against them. For a more detailed account of the culture of this plant, see *Encyc. of Agr.* p. 852, *N. E. Farmer*, vol. vi. pp. 307, 322.

THYME.—*Thymus vulgaris.*—There are, according to Loudon, two species of thyme, cultivated for culinary purposes, the *common* and the *lemon* thyme.

Common or *garden thyme* is a native of Spain and Italy. Of this there are two varieties, the broad and the narrow-leaved, besides the variegated, grown for ornament.

Lemon thyme—*T. citriodorus*—is a very low evergreen shrub, trailing, and seldom rising above four or six inches in height. It is distinguished by its strong smell of lemons.

Culture.—The plant is best raised from seed. Sow as early in the spring as the season will permit, in a bed or border of light, fine earth, either broad-cast, scattered thin, and raked in lightly, or in small, shallow drills, six inches asunder. The after-culture is simple, and similar to that of other sweet herbs, such as marjoram, sage, &c. "In soils which are cold, stiff, or moist, it does not thrive; its branches become ragged, its leaves few, and its flowers, and their peculiar aroma, feeble and faded."—*Armstrong.*

Use.—"The young leaves and tops are used in soups, stuffings, and sauces. For these purposes, the broad-leaved common is generally preferred; but the flavour of the yellow is much liked in peculiar dishes."—*Loudon*. "All the parts of this plant, but particularly the calyx of its flower, yields an essential oil, yellow and odorous, and highly charged with camphor. In the kitchen, it is used as an ingredient in sauces and stuffings, and in what are technically called *forced meats*."—*Armstrong*.

TOMATO.—*Solanum lycopersicum*.—"This plant is of the same family with the potato, and, like it, is a native of Southern America. It has several species, two of which fall under our notice as garden vegetables, and are distinguished from each other only by a difference of size. The smaller is held to be the parent plant, and has the advantage of ripening sooner, and better resisting cold weather. To have an early crop, sow the seeds in a dry and warm soil, and sheltered situation, in October, and cover the bed with straw, or stable-litter, during the winter. For summer and fall use, sow again in May, and water freely. If the soil and situation be favourable, and the culture proper, the product will be great. The distance between the plants should not be less than two feet."—*Armstrong*.

Use.—"When ripe, the fruit, which has an acid flavour, is put into soups and sauces, and the juice is preserved for winter use, like ketchup; it is also used in confectionary, as a preserve, and, when green, as a pickle. Though a good deal used in England, in soups, and as a principal ingredient in a well known sauce for mutton, yet our estimation and uses of the fruit are nothing to those of the French and Italians, and especially the latter. Near Rome and Naples, whole fields are covered with it; and scarcely a dinner is served up, in which it does not, in some way or other, form a part."—*Loudon*.

TURNIP.—*Brassica rapa*.—Russell's Catalogue contains the following *varieties:*

Early white Dutch;
Early garden stone;
White flat, or globe;
Green round;
Red round;
Swan's egg;
Large English Norfolk,
Long tankard, or Hanover;
Long yellow French;
Yellow Dutch;
Yellow Maltese;
Yellow Aberdeen;
Yellow stone;
Yellow Swedish, Russia, or ruta baga;
Dedham.

The first three sorts are fittest for early, first succession, and main crops. The French turnip, according to Loudon, is of excellent flavour, and is in high repute in France, Germany, and Holland. The Swedish, for its large size and hardy nature, is extensively cultivated in fields for cattle, it is also occasionally raised in gardens for the table, to use in winter and spring.

Seed estimate.—For a seed-bed four feet and a half by twenty-four, the plants to remain and be thinned to seven inches' distance, half an ounce.

Time of sowing.—Make first a small sowing of some of the early sorts, in the last fortnight of March or the first days of April, for turnips in May and June; but, as these will run to seed the same season, make a larger sowing about the middle of April. The first considerable sowing may be about the middle or towards the end of May, for roots to draw young about the end of June, and in full growth in July and August. The principal sowing should be about the middle of July. "Doing it on a set day is ridiculous; for a time should be chosen when the ground has the right degree of moisture to make the seed vegetate; and if this should happen a week earlier or a fortnight later than the usual time, it need not be regretted; but the opportunity ought to be embraced."—*Abercrombie.* They may be sown to advantage in New England as late as the first week in August; and those which are put into the ground so late will be less liable to be injured by insects than when sown earlier.

Soil and situation.—Sand or gravel, with a mixture of loam, produce the sweetest and best flavoured roots. It should be made fine, but not too rich, lest the turnips be rank and ill tasted. Ground which has been newly cleared from the forest yields the largest and sweetest roots; and on such spots there is least danger from insects. "Next to new land, swarded ground is to be chosen for a crop of turnips; and the way to prepare it is, to plough it pretty deep in the spring, and fold it by turning in the stock for a good number of nights; for there is scarcely any of our fields sufficiently rich to produce turnips without manuring; and folding hitherto appears to be the best method of enriching the ground for this purpose. It should be well harrowed as often as once a week, while the folding is continued, to mix the excrements of the cattle with the soil." —*Deane.*

Process in sowing, and precautions against the fly.—"Let the ground be well broken by regular digging, and neatly levelled to receive the seed. Procure bright, well dried seed. At a season when the turnip-fly is not apprehended, the seed may be put into the ground without any preparation, either alone or mixed with a little sand; but in the hot weather of summer, it is advisable to use some cheap and effectual preventive of the fly. It appears from a trial of Knight, at the suggestion of Sir Humphrey Davy, that lime slaked with urine, and mixed with a treble quantity of soot, if sprinkled in with the seed at the time of sowing, will protect the seeds and germs from the ravages of this pernicious insect; but this antidote cannot be conveniently applied unless the sowing be in drills. A yet simpler emedy, found by Mean to be perfectly successful, is, to eep the seed in sulphur-water, putting an ounce of sulhur to a pint of water, which will be sufficient for soaking about three pounds of seed."—*Abercrombie.*

The method of sowing is either broad-cast or in drills. In the former mode, Abercrombie directs to allow half an ounce of seed for every one hundred square feet. Deane says, the quantity of seed for an acre is never less than one pound—more frequently a pound and a half, and sometimes two. In sowing by broad-cast, the seed may be covered by drawing a "light harrow backward, that is, wrong end foremost, to prevent the tines, which are generally set somewhat pointed forward, from tearing up the sods, and burying the seed too deep." If sowed in rows, the drills may be an inch deep, and twelve or fifteen inches asunder.

Subsequent culture.—As soon as the plants have rough leaves, about an inch broad, hoe and thin them to six or eight inches' distance, cutting up all weeds. As the turnips increase in the root, a part may be drawn young, by progressive thinnings, so as to leave those designed to reach a full size ultimately ten or twelve inches apart.

Taking and preserving the crop.—In England they feed the turnips off the ground with sheep, or draw them up for neat cattle, through the winter, as they are wanted; but, in this country, they must be harvested in autumn, about the end of October, or even earlier in some seasons and places, and stored and saved, as directed for preserving other roots. See page 50.

To save seed.—"Some of the best roots of the middling size should be planted early in the spring, in a good spot, free from shade. They should be in rows, eighteen inches asunder, and the ground must be kept clear of weeds till the seed is ripe. Stakes and laths may be needful round the outside, to keep the branches from falling to the ground before the seed is fully ripe."—*Deane.* "It is preferable, however, to procure turnip-seed, as indeed that of most

other vegetables, from the regular seedsmen; as the seed farmers have opportunities of keeping the sorts distinct, which cannot be within the precincts of a walled garden."
—*Loudon.*

Use.—The common culinary uses of the turnip, boiled, mashed, &c., are too well known to need any notice We shall mention some uses not so common.

"*For feeding horses.*—These, when fed on turnips, are induced to eat the barn-chaff, and other dry food, with a good appetite—are kept healthy, and will work without corn.

"*For feeding cows.*—To make sweet and well tasted butter from the milk of cows fed on turnips, let the milk vessels be kept constantly clean and well scalded with boiling water, before using. When the milk is brought into the dairy, to every eight quarts mix one quart of boiling water; then put up the milk into the bowl to stand for cream.

"*As a substitute for bread.*—When the dearness of all sorts of corn occasioned many poor people in Essex [England] to make bread of turnips, they took the peeled roots, and boiled them in water till they were soft; then, strongly pressing out their juices, they mixed them with their weight of wheat-meal; and adding salt, yeast, and warm water, they kneaded it up as other paste; which, having lain a little while to ferment, they ordered and baked as common bread."—*Gleanings in Husbandry.*

VINE.—*Vitis.*—Many gentlemen in this neighbourhood have given considerable attention to the cultivation of grapes in the open air upon open trellises, and some have succeeded remarkably well, although they have had to contend with the many difficulties which that delicate and delicious fruit is subject to in this climate.

Having given some personal attention to this fruit for several years, I am satisfied that it can be raised in great perfection, and with little trouble to the cultivator, if he set out right in the first instance, and follow up the system prescribed with attention and care.

Although most men, who have any knowledge in horticulture, know more or less respecting the mode of cultivating this plant, yet there are many new beginners, who may collect some hints from these notes, which may aid them in the outset; and many gentlemen, who have been long in the habit of raising grapes in their gardens, may obtain some information as to the means of preserving the plants from the destructive insect which has of late years attacked the vines, and destroyed the promise of their early growth and the fair appearance of their fruit.

The best treatises on the subject of raising grape-vines recommend planting the cuttings in pots; but in this country it is entirely unnecessary, as the plants may be easily raised in the open grounds with little trouble and no expense; and if we can add to our collection of fine fruits one, which, in sickness as well as in health, is the most refreshing and nutritive of any that we possess, with little expense, and even with profit to the cultivator, we shall do a great good.

The best mode of raising the plants is by cuttings taken from the vines at the fall pruning, and preserved in earth till spring. These may be made either of one eye or bud, or of four or five, attached to a small portion of the two years' old wood, forming a cutting in the shape of a small mallet.

The 1*st year.*—They may be raised in a small nursery-bed, prepared of a good light soil—set in the ground six inches distant from each other, with the rows wide enough apart to permit them to be weeded with a narrow hoe; or, they may be put, in the first instance, where they are to be reared, and left to grow, at the distance of five, six, or seven feet, or more, according to the wishes of the cultivator. In this latter case there should be three cuttings put into each spot, six inches apart, to ensure the setting of one. When this is ascertained with certainty, the two weakest may be withdrawn, leaving the best of the three to grow. If the cuttings be of one eye each, they should be from the last year's growth, and a small piece of the branch, an inch long, should be left attached to the bud, and extending half an inch on each side of it. These should be planted two inches below the surface, with the bud uppermost, and a small stake placed by the side of them, that they may not be disturbed. If the cuttings are of several eyes, they should be laid in the ground sloping, leaving one eye level with, or only just above, the surface. They should be kept moist, but not wet, as this will rot them. A spot which receives the morning sun till eleven o'clock, and not afterwards, is the best for a nursery-bed for them; but, for permanency, they should be planted where they will receive the sun longest; and, in this case, they should be shaded at noon day until they have entirely put out. One bud only should be allowed to push from the cutting the first year; the plant should be kept free from weeds; the earth kept light around it, and as soon as the shoot has attained strength enough to produce laterals they should be rubbed out, and the shoot tied to a small stake, by which means it will gain firmness, and the admission of the sun and air to the shoot will prepare it to bear the frost of the fall, and prevent its imbibing the moisture which it would otherwise be subject to, when covered with earth in the winter. By the first of November the shoots may be cut down to two eyes, and by the middle of the month, if it be dry weather, they may be covered over with earth, forming a slope to cast off the wet and prevent the rains from penetrating—as the drier the plant is kept during the winter, in the better state it will be in the succeeding spring.

The 2d year.—The plants should not be uncovered in this climate till the middle of April. Those from the nursery should now be transplanted to the places where they are to remain; a shoot from each eye should be permitted to push, but as soon as you have ascertained which of the two will be the strongest and the best situated, you will preserve that, and rub out the other. The shoot preserved you will be careful to tie up to a small stake, as soon as it has length enough for this purpose, to prevent its being broken by the wind or other casualty. During the summer, the laterals from the four or five lowest buds must be rubbed out, and the shoot be carefully protected by being kept tied every eight or ten inches.

The next fall you may cut this shoot down to two buds, (not counting the one in the crotch of the plant between the old and new wood,) and cover over as before.

The 3d year.—You will allow shoots to push from both the eyes, and suffer them to grow, taking care of them as recommended above; but the bud in the crotch must be rubbed out. This year you must rub out the laterals from the five lowest buds, and nip in the other laterals to one eye, so that, if the plant grows luxuriantly, the sap may burst from the buds of the laterals, and not from those of the main branch, as it would do if the vine was dressed too close. Be careful to keep the branches tied up, that they may not be broken. In November, cut down the two branches as follows: the most feeble of the two, to two buds, to produce wood branches the succeeding season; and the strongest to three buds, for fruit branches, and cover them as usual.

The 4th year.—If you keep your vines properly dressed, you may have your first fruits without injury to your plants. After this, the system to be pursued must depend on the strength of your vines, and this will depend on the goodness of the soil and the care you take of your plants. But, as a general rule, the following points must be attended to:—

1. The number and length of your fruit branches must always depend on the strength of your plant; the wood branches are always to be cut down to two eyes.

2. No more branches should be left on the vine than it can nourish well and abundantly; this will depend on its age, and the soil in which it grows.

3. The branches should be cut in alternately for wood and fruit branches, observing to cut for wood branches as low down on the plant as possible, so as to renew your wood near the bottom annually. No shoots should be permitted to grow from the old wood, unless wanted for this purpose.

4. No more shoots should be permitted to grow than can be laid in clear, and handsome, and without confusion, on the trellis, and so as to admit the sun and air freely among the branches.

5. The laterals should be rubbed out of the wood branches six or eight eyes high, and those that are permitted to remain should be pinched into one bud. The laterals on the fruit branches should be rubbed out from the insertion of the shoot to the uppermost fruit inclusive, and the others pinched in as above. If the shoots are *very* strong, the upper laterals may be allowed to grow, to take up a greater portion of the sap; but this should not be done unless there is danger of the eyes bursting in the main shoots. Be careful always to keep the shoots tied up near their top.

6. Never leave more than five good eyes on a fruit-bearing branch, unless your vine is confined to a narrow space, and you are obliged to preserve only two or three fruit branches; in this case the length of the branch must correspond to the nourishment it will receive from the plant. Select the roundest and fairest branches for fruit, and the lowest and most feeble for wood. The closer the buds are together, or the shorter the joints of the branch, the better they are for fruit; these may in general be cut to three, four, or five eyes, according to their strength. But in vineries covered with glass, where two fruit-bearing branches only are left on strong vines, twenty, thirty, and forty buds are sometimes left on fruit branches.

The foregoing rules will be sufficient for any one to build up a vineyard sufficiently large to supply himself, his friends, and the market, with grapes. But, to promote and forward their maturity and size, the following course may be pursued:—

The first of July you will be able to see the state of your fruit, which will be just formed. At this time select the highest fruit branches, and those which have the finest appearance of fruit upon them, and perform the following operation on the two years' old wood, from which these branches proceed, taking care not to cut below any of the wood branches.

Take a pruning knife with a smooth edge and hawk's bill, and pass it round the branch where the bark is clear from knots, cutting deep enough to reach the sap-wood of the plant; at a quarter or three eighths of an inch below the first cut make another, running parallel with the first; then make a perpendicular cut through this section of the bark the same depth, and you may take out the ring of bark clear from the branch. This will not prevent the sap rising into the upper part of the branch, but it will prevent its descending below this cut, by which means it will be retained in, and distributed throughout, the upper part of the branch, in a greater portion than it could otherwise be, and the branches and fruit will both increase in size much more than any of those that are not thus treated, and the maturity of the fruit will be advanced very much.

This has been denominated *girdling*. If the plant is very vigorous and the season very favourable, the wound will soon be closed, so that it may be necessary to open i a second time. This process does not injure the plant, as you only girdle the fruit-bearing branches, which you would in any case cut out at the fall pruning, to make room for the branches which you have been bringing forward to give you fruit the succeeding year. This may be kept up from year to year, and give you a succession of ripe fruit from the first of September to the close of the season. The fruit on those branches which are not girdled will ripen the latest, of course, but neither these, nor those which have been girdled, should be shortened, as is customary on vines not thus treated.

By this practice, which was first suggested in the Transactions of the Horticultural Society of London a few years since, and first brought into use in this country with success by the corresponding secretary of the Mass. Agr. Soc. I have raised grapes in the open air this year, the bunches of which weighed from eight to twenty-eight ounces, and the berries measuring from two to three inches in circumference. On one vine which I planted a few years since—*a cutting* in the spot where it now grows—I had seventy bunches of fine chasselas, weighing from eight to eighteen ounces each.

But the grape-vines have of late years been attacked by a small insect which makes its appearance first in June, but is most abundant in August. This insect, if left to increase, destroys the vegetating principle in the leaf, and the plant languishes, the fruit mildews, and the labour and care of the cultivator are lost. Some gentlemen have abandoned their vines in consequence of the depredations of this insect, and others, with great labour and expense of time, have attempted, but in vain, to destroy them with alkalies and tobacco-juice. This has, to be sure, operated to check them partially, but not effectually. To remedy this evil, you have only to make a small, light frame, twelve or fourteen feet long, in the form of a soldier's tent, but with hinges of leather where the top joins, so that this tent may be shut up or opened at the bottom to any width you may require, according to the height of your trellis. This light frame, which should be made of slats of boards from one to two inches broad, may be covered with an old sail, or some cheap glazed cotton cloth, which will stop the smoke, leaving cloth enough loose at each end to close over, and prevent the smoke from escaping when the tent is spread over the trellis.

A few tobacco-stalks, moistened and put on some coals in a pan, will be sufficient to smoke the vines thoroughly; and, as the tent is easily moved along the trellis on some small wheels, one man may, in a few hours, extirpate this enemy of the vineyard. Vines that are already attacked by this insect to any great degree should be smoked in June, July, and twice in August, or oftener, if you find the insect is not completely destroyed.

The insects are first seen on the under part of the leaf, without wings—very active, but easily destroyed if touched. They afterwards assume the winged state, when it is very difficult to get at them, as they fly off on the vines being touched. They are yellow, striped with brown across the back. The moment the smoke ascends, the winged insects quit the leaves, and fall to the ground dead or alive; the young ones perish, but the older ones will revive if not destroyed in their torpid state. To effect this, you have only to cover the ground under the tent with a piece of wet cloth before you begin to smoke, to which they adhere un til the tent is removed, and they are revived by the atmospheric air; to prevent which you will roll, or twist, the cloth each time that you remove the smoke-house, or tent, and replace it again each time before you smoke, by which means they will be effectually destroyed. This simple and cheap operation will keep your vines clear of this troublesome and destructive insect, and you may, if the season be warm, ensure a good harvest; if otherwise, you will be sure, if the vines be girdled, to ripen a portion of your fruit, at least

CALENDARIAL INDEX.

The object of this Calendar is little more than to give brief intimations of work to be performed in a garden, together with some approximation to the time of year in which it should be accomplished. The figures refer to the pages in which further directions may be found relative to the operations adverted to. These directions are intended for the New England States, or about the latitude 42° N. and the vicinity, or a small elevation above the sea.

Allowance should be made for elevation of site, as well as for situation north or south of that degree. But it is not possible, perhaps, to state what that allowance should be with any approach to precision. The nature of the soil, the aspect, the exposure, the forwardness or backwardness, or what may be styled the general character of the season, are all to be regarded; and require the exercise of a sound discretion in the cultivator, not to be restricted by general rules, which are not liable to too many exceptions to be noted in this work.

JANUARY.

Throughout New England the temperature of the climate is such as to exclude the cultivator from performing most of the operations of tillage or horticulture from about the first of December to the latter part of March, or the beginning of April. The seeds of knowledge may, however, be sown in winter and the horticulturist may cultivate his mind when his soil is bound in frozen fetters.

Provide a sufficient quantity of bean-poles, and pea-rods, which you may preserve in a corner of your wood-house, or other place suitable for your purpose. Many people, who neglect to procure these implements in season, are induced, by the hurry of business, to permit their peas and beans to trail on the ground, in which situation they will not produce, especially the tall growing sorts, one third part so many as if they were properly supported by poles and rods. The length of your pea-rods should be in proportion to the sorts of peas for which you intend them, 229. The same kinds of rods, which the tall-growing peas require, will answer for the generality of running kidney beans. The Lima beans will need strong poles, from eight to nine feet high. You may now make preparation for forcing cucumbers and melons, 84, 202.

FEBRUARY.

Manure may be carried into those places where it is needed, left in a heap, but not spread. Wherever and whenever the snow is off the ground, rake together and burn the haulm, or whatever may remain from the last year's crop. Fences should be inspected and repaired, and seed rubbed out and cleaned. Straw mats for the hot-beds, pales, rails, lattices, or trellises for espalier trees, should be got in readiness, 107. See that your garden tools are in good repair, and procure such new ones as may be necessary. It is now time to set about procuring and preparing materials for, and forming hot-beds, 161. Clean trees from moss, and protect them against mice and rabbits by whitewashing with lime, or smearing with some composition which is offensive to those vermin. Enter in earnest into the business of forwarding various kinds of seedling plants, by artificial means, so that they may have strong roots, and arrive at some size by the time they would naturally make their first appearance above ground. This may well be done by adopting Mr. Armstrong's method, with regard to melons, 202. Attend to your fruit in your fruit-room or cellar, on shelves or in boxes, and, if necessary, pick it over, and cull out whatever is defective; wipe the remainder dry, and pack it away anew. But if it is put down in some sort of grain, dry sand, flax-seed chaff, or, what is probably best of all, pulverized plaster of Paris, you will not need to meddle with it. You may now, perhaps, begin to force asparagus in hot-beds, 28. Sow under glass cases, for transplanting or otherwise, radishes, carrots, small salads, peas, beans, &c. Protect choice plants, which may show a disposition to vegetate, by matting, litter, cases of wicker, old bark, and other proper means.

MARCH.

Lettuce may be sowed in the open ground as soon as frost will permit, 191. It may be sowed between vacant rows, intended for other plants, and pulled out for use before the other plants are large enough to be encumbered by it. Early peas cannot be planted too soon after the ground is thawed, 226. Radishes may be sowed as soon as the seeds can be raked in. Sow cabbages, cucumbers, melons, cauliflowers, squashes, &c. in hot-beds, under glasses, &c. 84, 149, 202. Dig up vacant ground, applying manure. Dress borders, and clip edgings of box. Clean, relay, or make new gravel walks. Attend to, and turn over compost beds. Dress asparagus beds, or make new ones the latter part of this month or the beginning of April, 22. Select from your cellar the best cabbages with heads, and set them in some proper place to stand for seed. Set the different kinds remote from each other, to prevent their mixing at the time of blossoming. Likewise, set some of your best cabbage stumps for early salad and greens. If the ground is moist, set shallow; if dry, place them about six inches deep. Small salading, such as cresses, 80, 81, mustard, 207, 208, radish, 260, &c., when a constant supply is wanted, should be sown once a week or fortnight. Celery, for an early crop, may be sown in this month, though the principal sowing had better be deferred till April, 74. Artichokes should be sowed as early as the season will permit, 18, and horse-radish, 159.

APRIL.

In the Eastern States, generally, and in those parts of the Middle States where the ground is naturally somewhat moist and heavy, this is the month for sowing the principal garden crops. Sow the hardy kinds as soil, site and season will permit, that the plants may be firmly established before they are overtaken by the heat and drought of summer. But a stiff and moist soil should never, on any account, be dug, ploughed or harrowed when it is so wet as to be clammy and adhesive. On the other hand, a light, sandy soil will be meliorated by being hoed, or otherwise wrought on while moist.

"Earth of a consistence that will hold water longest *without becoming hard when dry*, is that of all others the best adapted for raising the generality of plants in the greatest perfection. The great art of improving sandy and clay soils is to give to the former such dressings of clay, cow-dung, and other kinds of manure, as will have a tendency to bind and make it more compact, and, consequently, more retentive of moisture; and, to the latter, coats of sandy earth, pond mud, horse dung," &c.—*M'Mahon.*

Sow artichokes, 18, asparagus, 22, horse, or garden beans, 33, kidney beans, 36, beets, 40, the last of this month, or the first of next, borecole, 51, Brussels sprouts, 55; sow cabbage seed, 60, set out cabbage plants, 61, sow cardoons, 67, carrots, 68, cauliflowers, 72, celery, 74, coleworts, 79, succession-crops of cresses, 80, 81, cucumbers in hollowed turnips placed in a hot-bed, 87, or in pots under hand-glasses, &c.; propagate fruit-trees by cuttings, 95. You may set out a few dandelion plants in your garden, 97, and let us know how you succeed in attempting to domesticate them. Look out for, and destroy insects, 169; sow a little early summer endive, 105, fennel, 108; propagate garlic, 136, leeks, 190 lettuce, 191, marjoram, 197, onions, 213, parsley, 222, parsnep, 224, successive crops of different sorts of peas, 226, potatoes, 248, radish, 260, sage, 265, salsify, 266, savory, 266, sea-kale, 267, skirret, 281.

MAY.

You may now sow most or all the articles mentioned in the Calender for the last month, either as first or succession-crops. Plant your cucumbers, 82, and melons, 198, for a general crop in the open ground about the 20th; also, squashes, pumpkins, and gourds; likewise, Indian corn for an early garden crop, 164. Plant your bush-beans and pole-beans, for your principal crop, at any time when most convenient during the month, 36. It is recommended to set the poles, and then plant the beans round the poles. Weed and thin your advancing crops of radishes, 261. Transplant radishes for seed, 262. Sow succession-crops of spinach, 282. Carrots may be sown in the Eastern States in the forepart of the month, 68. Weed and thin beets, carrots, parsneps, onions, early turnips. Sow more turnips of the early kinds for crops in succession. Such sowing is best performed in the first week of the month, in order that the roots may have time to grow to a good size before they are overtaken by summer heat and drought. Early cauliflower plants, as they advance in growth, should have earth drawn up about their stems, and be watered in dry weather. You will do well to sow peas for succession-crops, at least twice this month, 226. You may set out or transplant early lettuce. Sow as many of the sorts of small salading as you may need for market or family consumption. Now is, perhaps, as proper a time as any in the year for pruning fruit-trees, 257. The season for pruning is immediately before, or commensurate with, the rising of the sap. Let your ducks have constant employment as *vermin pickers*, 102. Attack insects by sprinkling over them, by means of a syringe, watering-pot, or garden engine, simple water, soap-suds, decoctions of tobacco, of elder, &c. &c. 169.

JUNE.

Melons and cucumbers, which have hitherto been protected by glasses or paper frames, may now be exposed to the open air. If the season be at all dry, your vegetables, particularly your cucumbers, will need water. [See Introduction.] Keep your crops clean, by hand-weeding and hoeing, as directed page 158. About the last of the month, you may sow crops of melons and cucumbers for pickling. Thin forward melon plants, leaving only two or three in a hill, 201. Attend to your cabbage and cauliflower plants, as well as your beans, &c. and see that they are not destroyed by the cut worm. "If you perceive any plants injured, open the earth at the foot of the plant, and you will never fail to find the worm at the root, within four inches. Kill him, and you will save not only the other plants of your garden, but probably many thousands in future years." Hoe and bush your late peas; plant more potatoes, succession-crops of kidney beans, 36, peas, 226, small salads and lettuce every week or ten days. "Thin out and earth up all your plants; remember that frequent hoeing is both rain and manure to your vegetables in dry weather." Celery plants may now be planted out in trenches, 74. When the plants have grown to the height of eight or ten inches, draw earth about them, breaking it fine. This should be done in dry weather, being careful not to bury the heart. Plant out cabbages, cauliflowers, broccoli, &c. in moist or cloudy weather, but not when the ground is wet and heavy, 61. Cut and dry such herbs as have come to maturity, for winter use. You may as well dry and pulverize some kinds, as directed p. 205. Look over your grafted trees, and you may ascertain whether the scion has united with the stock. Take off the clay, and loosen the bandages of such grafts as have succeeded, and tie weak grafts and dangling shoots from budded stocks to neat stakes. Rub off all superfluous, irregular, or ill placed shoots or suckers. Where your fruit-trees appear to be overloaded with fruit, pick off a part, and carefully gather all that which has fallen and give to your swine, in order to destroy the curculio. 176.

JULY.

Clean and prepare your ground where your early crops of peas, spinage cauliflowers, and cabbages grow, and all other vacant spots, to cultivate there on such plants as are proper to supply your table, in autumn and winter, with later-grown productions. You may continue to sow crops of small salading every eight or ten days, as directed in former months; but they should now be sown on shady borders, or else be shaded by mats, occasionally, from the midday sun, and frequently watered, both before and after the plants appear above ground. You may now plant out your celery plants in trenches, 74, unless you have already performed that operation, as directed last month. About the middle of July, and from that time to the end of the first week in August, you may sow turnips, 292. Thin and transplant such lettuces as were sown last month, and sow more lettuce-seed in the beginning, middle, and last week of this month, in order to have a constant supply for the table, 191. Sow likewise radishes, 261, and in the last week of this month a good crop of spinach may be sown for autumn use; it will not then be so liable to run to seed as in the preceding months. It is a good practice to sow early kinds of cabbages, 60, about this time, for a supply of young greens during autumn. Collect all kinds of seeds as they come to maturity, cutting off or pulling up the stems with the seeds attached, as they ripen. Spread them in some airy place under cover, turning them now and then, that the seeds may dry and harden gradually, and be careful not to lay them so thick as to hazard their heating and fermenting. When they are sufficiently dry, beat out and clean the seeds, and deposit them in bags or boxes till wanted. Give water to such plants as require it, but let this be always done in the evening, that it may be of use to the vegetables before the sun shall cause it to evaporate.

You may now inoculate or bud your fruit-trees, 165, and, where it can be done without inconvenience, it will be well to turn swine into your orchard to eat the fallen and decayed fruit, and thus destroy the insects which it contains. If, however, this cannot well be done, or you have not swine in sufficient numbers to devour all your fallen fruit, it will be well to gather and carry it from the ground before the insects, which inhabit it, make their way into the earth, and make you destructive visitations another season.

AUGUST.

Keep all your crops clear from weeds, using the hoe where safe and convenient; otherwise make claw-hoes of your hands, and weed-extracting nippers of your thumb and fore-fingers. Pull up the haulm of peas, beans, &c., and remove it to your compost bed; bury it between rows of plants, or throw it, together with all weeds, &c. to your swine, that your premises may have a neat appearance. Cut such herbs as are now in flower, to distil, or to dry for winter use, being careful to do it when they are dry, and spread them in a dry, shady place; for, if they are dried in the sun, they will shrink very much, turn black, and prove of little value. Your dung-hills and compost-heaps should, during the summer months, be kept free from weeds; for if the seeds are permitted to ripen and fall, the dung, when carried into the garden, will disseminate weeds innumerable. Attend to plants set out for seed, and put stakes to such as need support. This month, as well as the latter part of July, is the proper season for inoculating or budding, 165. M'Mahon says, "Cherries, plums, or any other fruit-trees, may be budded in August, if the bark parts freely from the stock. Pears ought to be inoculated the early part of the month, or while the sap flows freely; but the peach, nectarine, almond, and apple, will succeed any time between the first of August and twentieth of September, provided the stocks are young and vigorous."

Preserve peach, plum, cherry, and apricot stones, &c. to sow for raising stocks to bud and graft on. These may either be sown immediately, or kept in common garden earth or moist sand. But it will be necessary to sow them before the stones open, and the radicles begin to shoot; otherwise many of them will be broken or torn in the process of sowing. Every day they are kept on of ground is an injury to them; and if they remain in a dry state till spring, very few will vegetate till a year after, and the greater number not at all. Continue to collect and preserve seeds as directed last month. Sow onions to stand over winter, 218; likewise, cauliflowers, 72.

SEPTEMBER.

Hoe and thin your growing crops of spinach, 283. In the first week of this month, sow a full crop of the prickly-seeded kind for winter and spring use, 283. And, at the same time, you should sow a good supply of the early short-top, white and red turnip-rooted and salmon radishes, 260. Earth up celery as it advances in growth, but be careful to avoid covering the hearts of the plants. This work should be done in a dry day. See that you do not bruise or injure the stalks; for if they are crushed or wounded, they will be subject to rot, 75. Gather all kinds of seeds as they ripen, which may be necessary for the ensuing season. Towards the latter end of the month, you may safely transplant all kinds of hardy perennial, aromatic, and medicinal herbs, which will thus become well rooted before winter. This work should, if possible, be done in moist weather. Pull and preserve your ripe onions, 219, and sow more to stand over winter, 218. Protect your grapes and other fruit against wasps. This may be done by hanging up phials of honied or sugared water near the fruit you wish to defend from their attacks, in which many of the tiny depredators will be caught and destroyed. Thoroughly clean from weeds all the seed-beds and young plantations of trees, shrubs, &c. Gather cucumbers and mangoes for pickling before they spot. Sow cauliflowers about the 20th, 72.

OCTOBER.

The young cabbage plants, produced from seeds sown last month, and intended for early summer cabbages, should be transplanted into the beds in which they are to remain during winter, 60.

Prepare a bed for them, the width of your garden frame, in a warm, well-sheltered place, where the sun has the greatest power; yet be careful never to admit the direct sunshine on the plants, when in a frozen state. When you have no glasses, the plants may be protected during winter by boards or mats, giving them air in mild weather. Cauliflowers sown in August or September should be raised carefully, and protected, during the cold season, in garden frames, with boards, mats, &c., or perhaps some may survive if set in open borders, 72, or they may be set in pots, 73. Weed and thin your late crops of spinach, leaving the best plants at the distance of three, four, or five inches asunder, 283. Early in the month, hoe and earth up the late-planted crops of cabbages, broccoli, and borecole, cauliflowers and other plants of the brassica genus. Towards the end of the month, if the stalks of asparagus turn yellow, cut them close to the earth; clear the beds and alleys from weeds, and carry them with the stalks off the ground. It will then not be amiss to cover the beds and alleys with old litter, well trodden down, to be removed in the spring. Or you may apply manure now, instead of in spring, as directed page 25. Cut down all decayed flower stems, and shoots of the various kinds of aromatic, pot and medicinal herbs, close to the plants; clear the beds from weeds and litter, and carry the whole off the ground. Onions may now be planted out to raise seed, instead of setting them in the spring, as directed p. 219. The seeds of dill, skirret, rhubarb, sea-kale, may now be sown; for, if kept out of ground till spring, many of them will not vegetate till a year after; but when sown in October or November, if the seeds are fresh and perfect, they will vegetate in the April following. Begin to take up and secure potatoes, 255, beets, 49, carrots, parsneps, turnips, Jerusalem artichoke, &c., 50. Give a general hoeing and weeding to all your crops, and carry the weeds out of the garden. Such spaces of ground as are now vacant should be dunged, dug, or trenched, and thus have the advantage of a winter fallow, and that exposure to frost, which will reduce it to fine tilth, and destroy worms, the larvæ of insects, &c. The old beds of strawberries should, some time in this month, be cleaned from weeds, and the vines or runners taken off close to the plants. Then, if there be room, loosen the earth to a moderate depth between the plants, taking care not to disturb the roots. And if the plants are in beds with alleys between, line out the alleys, and let them be dug a moderate depth, breaking the earth very fine, and spreading a sufficiency of it over the beds, between and round the beds, taking care not to bury their tops. A slight top dressing of compost, such as described p. 286, may now be applied. It may now be time to gather and preserve apples and pears, 13, though it is best to let them remain on the trees as long as they are safe from frost, 15. If you are not apprehensive of the depredations of mice, rats, squirrels, &c. you may sow the stones of plums, peaches, nectarines, apricots, &c.; or you may, if you think it more prudent, preserve them in sand till March or April.

NOVEMBER.

Gather from your garden, before the hard frosts commence, all those fruits of your labours, which you wish to preserve through the winter, not forgetting winter squashes. Take up and preserve cabbages, as directed p. 65. Preserve your celery, 75. You may gather a part in dry weather, and pack it in boxes in dry sand, and place the boxes in a warm cellar, leaving the tops and leaves open to the air. Those cabbage and cauliflower plants, which you mean shall stand through the winter in frames, should, during the continuance of mild weather be allowed every advantage of free air, to inure them, by degrees, to bear cold. Take the glasses off entirely, in the warm part of the day, but place them on again at night, and in wet or cold weather. If your beets, turnips, parsneps, &c. are not secured, take them up, and preserve them, as directed last month. You may now sow the seeds of rhubarb, seakale, skirrets, parsneps, and many other kinds, which are somewhat slow in vegetating, and they will come forward early, and grow vigorously in the spring. In the beginning of this month, you may manure and trench the ground which is intended for early crops, and, if it be of a stiff, heavy nature, lay it up in ridges, to receive the benefit of the winter frosts. You may now sow early peas, to come up in the spring, if you can preserve them against mice, 227. This is, perhaps, as eligible a period as any for the planting of apple-trees, and other fruit-trees, 17, 220, or sowing seeds in a nursery, 208, 210. Lay light litter of some kind a good thickness over the roots of the more tender and choice kinds of trees and shrubs, to protect them from frost.

DECEMBER.

The severity of the weather in this month generally allows but little to be done in the Middle and Northern States. Should the season permit, you may perform any of the operations directed for last month, which remain unfinished. If the weather continues open, carry out and spread manure, and trench the ground, as directed for the last month. Provide from the woods, &c. pea-sticks and bean-poles, of suitable lengths and sizes, as directed in January. Collect all your old sticks and poles, which are still fit for use, and place them together with your new ones under cover, to prevent their rotting. Be careful to shut the frost out of the apartments in which you have stored your fruit for winter and spring use. Examine the fruit which you have on shelves in cellars, once every ten days, and take away any that you find tainted. Repair all decayed trellises, espaliers, &c. Procure stakes and other materials which may be wanted in a more busy season.

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